

Southern Power & Industry

The Industrial and Power Journal of the South and Southwest

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DECEMBER, 1957

SPI . . . 54th Year

REACHES industrial plants (manufacturing, process, utility and large service) in the South & Southwest.

SERVES plant managers, superintendents, engineering department heads and plant operating staffs.

PROVIDES information to solve design, installation, operating and plant maintenance problems.



FOURTY CENTS PER COPY

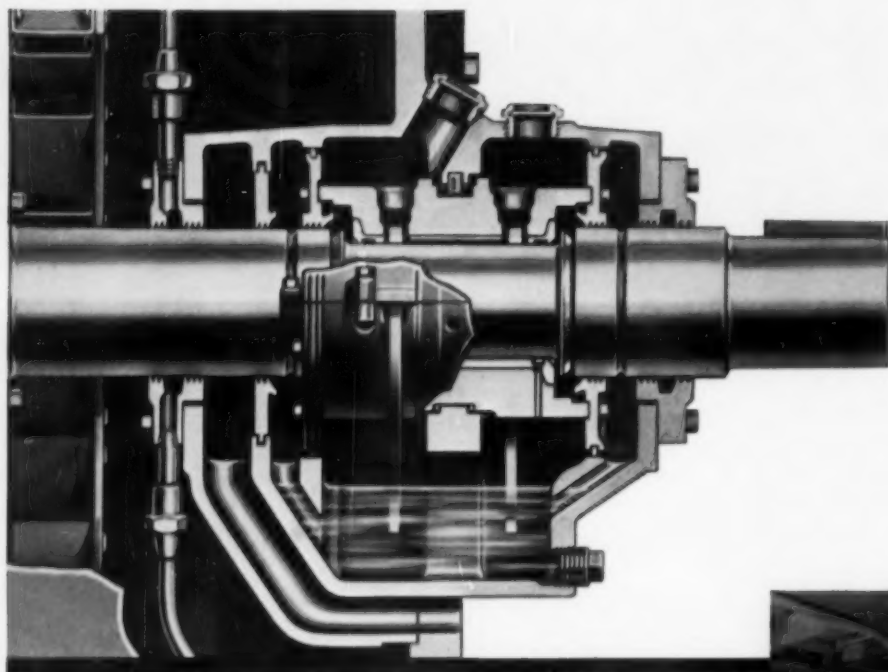


GANNON STATION of Tampa Electric Company is the first modern coal fired station in Florida. Pages 44-51 highlight general design features, major equipment, and construction costs.

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One of many reasons why **ALLIS-CHALMERS MOTORS**
operate dependably for
POWER PLANTS



**Motor Bearing
is "extra sealed"
with vent**

A VENT is seldom a seal . . . but it is in this high speed Allis-Chalmers motor.

Just in case any oil or oil vapor might pass out of the bearing enclosure through the regular seals it can never reach the motor interior. Instead, it enters an annular chamber at the rear of the bearing housing. Pressurized air from the motor fan region is introduced into this pressure chamber and is vented to atmosphere. Positive protection is provided.



Allis-Chalmers 1750-hp weather-protected motors driving boiler feed pumps.

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Many man-hours in maintenance are saved because the motor can be inspected and maintained without opening or disturbing the bearing itself. It is only necessary to remove the upper half of the split end shield.

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Volume 75

Number 12



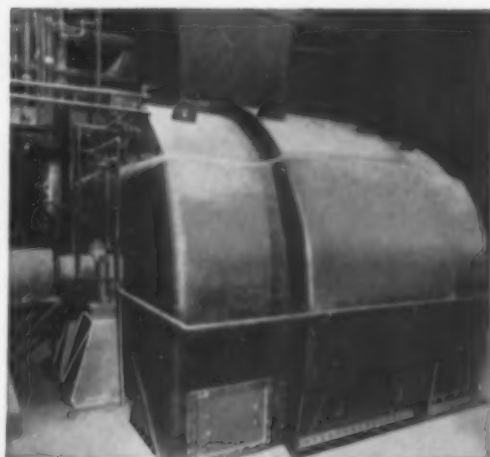
World's largest open hearth furnace utilizes Clarage Fans

600 TONS—enough steel in each heat for 300 automobiles. That's the capacity of Weirton Steel Company's new open hearth furnace at Weirton, W. Va. Weirton Steel is a division of National Steel Corporation.

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Investigate the advantages Clarage equipment offers for YOUR mechanical draft installations. Contact our nearest sales engineering office or write us for complete literature. **CLARAGE FAN COMPANY**, Kalamazoo, Michigan.

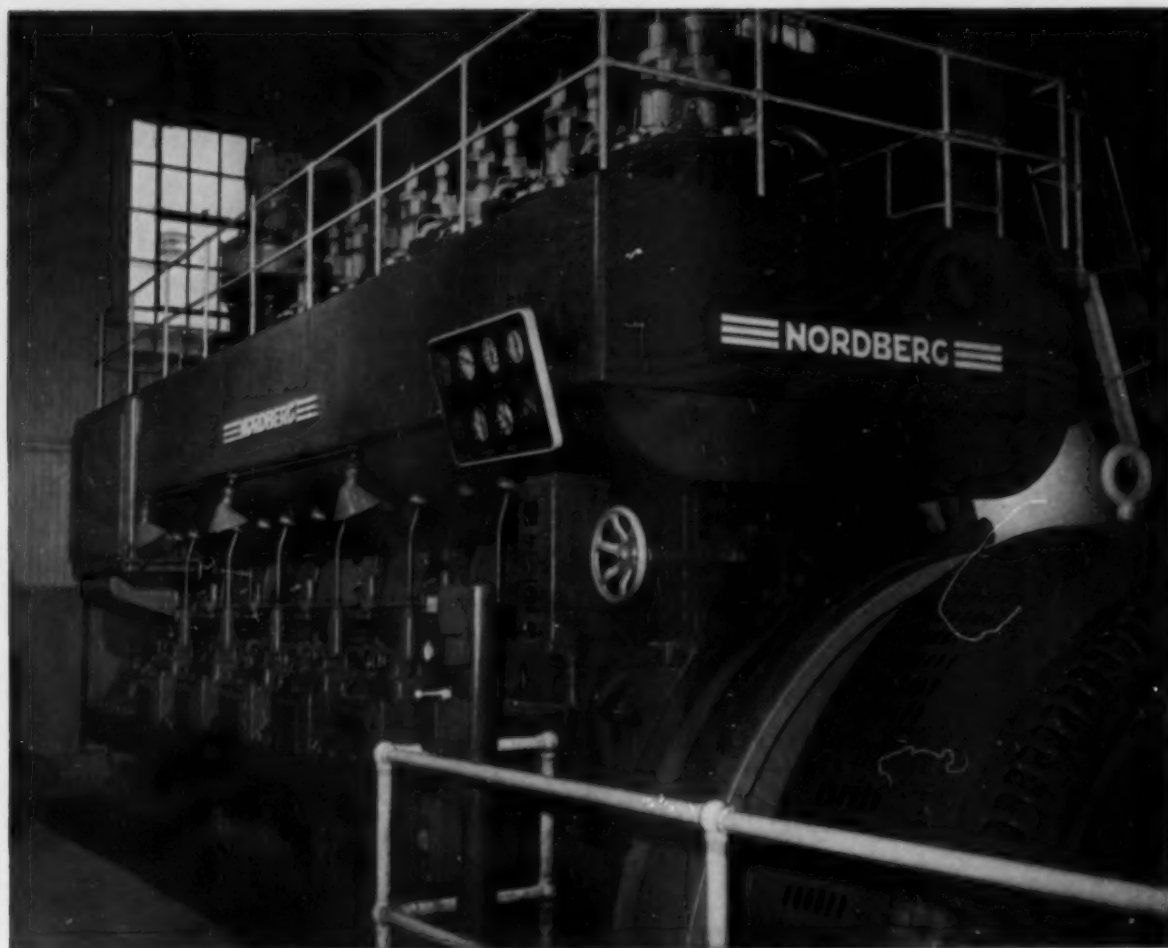


Clarage heavy-duty fan provides induced draft for waste heat boiler.

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Southern Power & Industry

The Industrial and Power Journal of the South and Southwest

Eugene W. O'Brien
Managing Director

Vol. 75
No. 12

DECEMBER, 1957

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Gannon Station of Tampa Electric — 8 Page Report 44-51

The first, modern, coal fired station in Florida

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SOUTHERN POWER & INDUSTRY for DECEMBER, 1957



Facts and Trends

December 2, 1957

- ◆ **SYSTEM CAPABILITY** of Tampa Electric Company by 1960 will be around 724,000 kw, an increase of 1,000% in 13 years. This growth has occurred in a franchise area of about 1,700 square miles, amounting to approximately 3% of the area of the State and containing 10% of its population.

Latest unit to go in service is Unit No. 1 at the new Gannon Station, which has a nominal rating of 120,000 kw and an expected gross capability of 135,000 kw. This is the first MODERN COAL FIRED STATION in Florida.

Description of the station, featured in this issue, highlights coal as fuel, design criteria; general design, boiler equipment, turbine, water treatment, centralized control, coal & ash handling, electrical equipment and construction costs.
(More information—page 44)

- ◆ **WELDING TECHNIQUE**, which eliminates need for metallic backing rings or inserts when welding butt joints in pressure piping systems, is being used by Stone & Webster Engineering Corp.

Root edges are bent to produce an internal circumferential lip. When edges of this type are fused together in an inert gas atmosphere, the concave condition inevitably associated with fixed position yield welds is eliminated.
(More information—page 55)

- ◆ **MAJOR INDUSTRIAL RESEARCH CENTER** will be located in a 4,000 acre park situated in the Research Triangle of North Carolina (North Carolina State College in Raleigh, Duke University in Durham, and University of North Carolina in Chapel Hill).

These three major universities with 2,000 faculty members and 18,000 students have extensive library and laboratory facilities. A million dollars is now being invested in services and improvements and an architectural firm is converting the tract into a scientific community.
(More information—page 41)

- ◆ **"PAY UP OR ELSE"** — If you were handling personnel relations for your company, would you "gun" your employees for obligations due local merchants?

In this month's MANAGEMENT CLINIC one company goes along with local merchants and every time a delinquent complaint comes in, sends the employee a letter that orders him to satisfy the complainer or face possible discharge. The men resent the letters and consider their doings away from work to be their own business. They object to the company acting the part of a collection agency.

Most companies take a dim view of employees going deeply in debt, but the threat of discharge is regarded by the vast

Engineering Contractors -

Stone & Webster...



Coal Handling Equipment by

Continental

As one of the South's oldest industrial citizens, Continental Gin Company congratulates Tampa Electric Company on their farsightedness in building Florida's first major coal-burning steam-electric plant to serve the industrial needs of the growing Tampa area.

The complete coal-handling system of the Gannon Station, starting with the crusher conveyor and ending at the bunkers, was supplied by Continental—including all mechanical and structural materials.

**INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY**

BIRMINGHAM, ALABAMA



ATLANTA
MEMPHIS

CLEVELAND
MOBILE

DALLAS
NEW YORK 17

KNOXVILLE

Facts and Trends (Continued)

majority as a last resort to be reserved for repetitive offenders only. SPI's MANAGEMENT CLINIC offers four constructive comments on this problem.

(More information—page 39)

- ◆ THE SOUTHEAST has advanced from the fourth largest producer of electric energy regionally in the nation to the Number 2 position. Last year the seven-state southeastern area produced 108.4 billion kilowatt hours, being exceeded only by the 162 billion produced in the East North Central states of Ohio, Indiana, Illinois, Michigan, and Wisconsin. In the latest U. S. Department of Commerce report, the Southeast also leads the nation in the rate of increase.
(More information—page 12)

- ◆ MAINTENANCE SLEUTH — The "Rube-G" — a product of Western Carolina Controls Company in Asheville, N. C., locates and follows underground, underwater or otherwise concealed metallic conductors. It also can locate grounded faults on normally ungrounded conductors.

Locator consists of impulser, amplifier, search coil, head phones and operating battery in single carrying case. Signal is audible 40 or more feet away from the conductor.

Before Rube-G became famous he was an improvised maintenance tool developed by an SPI subscriber — first described in our April '56 issue.

(More information—page 108)

- ◆ HIGH FREQUENCY can increase the light and life of your fluorescent lights. About 40 test installations coupled with recent new developments indicate a better performing lighting system may be installed using high frequency for an initial cost of the same or slightly less than the conventional lighting systems. Cost of operation has been reduced up to 25% in some installations. If you are building a new plant, expanding, or modernizing, check with your power company's lighting sales engineer on the advantages of high frequency systems.

- ◆ NEW CERAMIC MATERIAL, initially developed as a ceramic molding for casting metals to compete pricewise with sand casting, has found many other applications. Work has been done by Georgia Tech's Experiment Station for Atlanta's North Foundry Mold Company, headed by John North. The opaque, glassy-looking solid is considerably more economical than materials now on the market for similar uses.

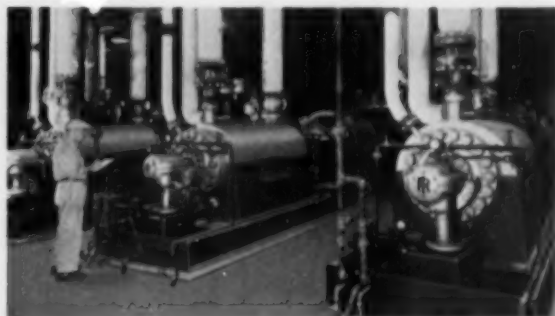
Where resistance to continuous thermal shock is required (production of molds for metal casting) material will withstand temperatures in the 2100 F range.

Where such extreme shock is not encountered (refractory brick for high temperature furnaces) it will stand up under the 3000 F range.

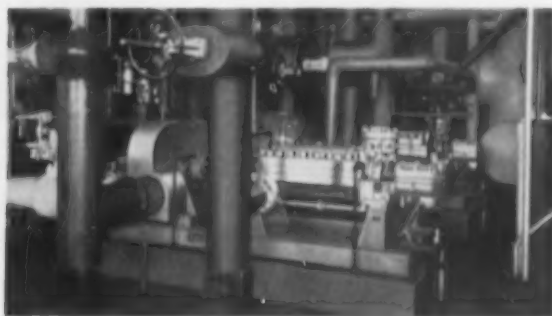
Where heat and thermal shock are applied suddenly for only short periods of time (nozzles and nose cones for rockets) the new ceramic material will withstand temperatures in the 4500-5000 F range.

BOILER FEED PUMPS **GIVE DEPENDABLE PERFORMANCE** **at all pressures, capacities, temperatures.**

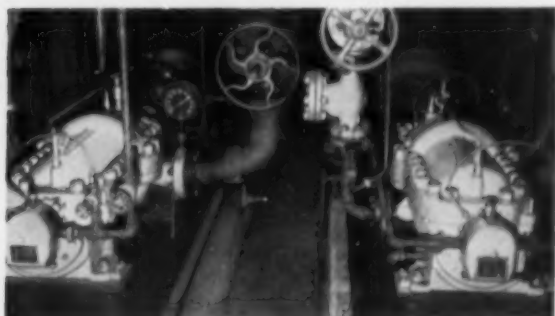
Typical I-R installations indicate wide range of use in central stations and industrial plants



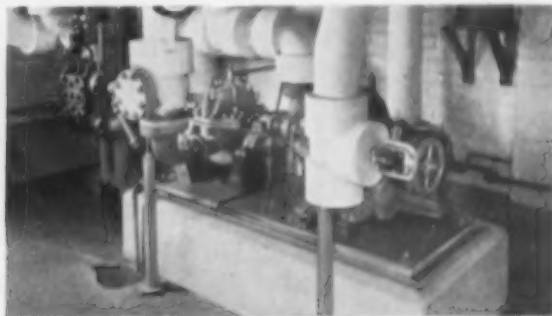
PRESSURES UP TO 6500 psi.—Class CHTA-CHTB: These multi-stage, cylindrical "double-case" pumps meet the most exacting needs of the highest-pressure boilers in modern central station service. Each of the above pumps handle 1100 gpm of feedwater at 2395 psi.



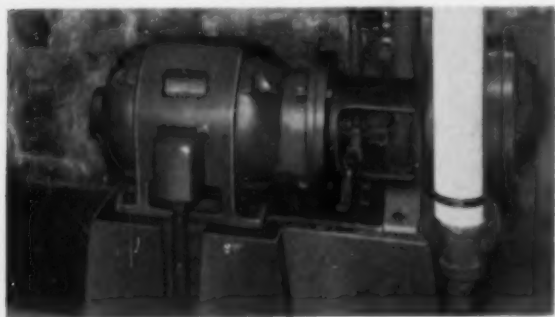
PRESSURES UP TO 1200 psi.—Class HMTA-HMTB: A complete line of multi-stage centrifugal pumps featuring a symmetrical, horizontally-split casing, and a simplified unit-type rotor assembly. The pumps illustrated are on boiler feed service in a large textile mill.



MEDIUM PRESSURES UP TO 1000 psi.—Class CNTA: Symmetrical design with unit-type rotor gives CNTA pumps higher efficiency, easier maintenance, and attractive modern appearance. Installed in a large paper mill, the boiler feed pumps shown operate at 3560 rpm and deliver 180 gpm at 605 psi.



PRESSURES TO 450 psi.—Class GT: Dependability is designed into this line of two-stage, horizontally split pumps. Standard construction includes renewable wearing rings and water-cooled, ring-oiled bearings. Pump shown serves as a boiler feed unit in a large candy factory.



PRESSURES TO 250 psi.—Motorpumps: A complete line of space-saving centrifugal pumps, including both close-coupled and cradle-mounted types. Single, two-stage, and vertical four-stage models are available. Pump shown is handling boiler feed in a leather factory.

Ingersoll-Rand boiler feed pumps have many refinements in design and construction that add up to high operating efficiency. Skilled manufacture and painstaking factory inspections assure dependability built into every pump. Inherent simplicity and ruggedness mean easier and less maintenance—and trouble-free performance.

Whatever pressure or capacity you need, Ingersoll-Rand can supply a boiler feed pump for the job. I-R engineers will gladly help you select the pump that meets your needs.

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SOUTHERN POWER & INDUSTRY for DECEMBER, 1957

For more information, use Reply Card—Page 99



Southern News Briefs

New Line Pipe Mill for Florida Plant

Aluminum Tubing Company's General Manager, Howard H. McCarl, has announced plans to install in Jacksonville, Florida, the Southeast's first Line Pipe mill for the manufacture of welded steel, stainless steel and aluminum pipe and tubing in the 4½" to 14" size range.

Steel pipe will be welded using equipment manufactured by The McKay Machine Company. McKay is a leading manufacturer of re-

sistance welders used in the manufacture of steel pipe. Stainless steel and aluminum pipe will be welded by the inert-gas-shielded tungsten-arc and high frequency resistance welding processes.

Steel pipe will be produced for oil and gas gathering, transmission and distribution lines, water and oil well casing, municipal and project water systems and construction piping. Aluminum pipe will be manufactured primarily for the irrigation industry with stainless steel pipe and tubing being produced for the chemi-

cal process and related industries.

Aluminum Tubing Company started its manufacturing operations at 2961 Old Kings Rd., in Jacksonville, Florida, early in 1954 with the South's first equipment for producing aluminum irrigation tubing. In 1956 the firm's sales of aluminum pipe in the United States and World markets topped \$2.9 million. The company produces approximately 10% of the aluminum irrigation tubing made in the United States.

The company expects to be in production early in March, 1958.



Southern Tool Distributing Co. Serves Metalworking—Southeast

Southern Tool Distributing Co., has in its Atlanta, Georgia warehouse at 54 Eleventh St., N.E., one of the most complete stocks of metal cutting tools, precision tools and die maker's supplies south of New York. The company was established to supply the needs of the fast growing metal industries in the Southeast and with adequate stocks in Atlanta.

The new company, headed by R. L. Hill, is housed in a modern building, designed to adapt itself to the ease of handling customer's orders for quick delivery.

Manufacturers represented on a stocking basis include: Atkins Saw Div., Bay State Tap & Die, Brown & Sharpe Mfg., Carboloy, Cleveland Cap Screw, Crucible Steel Co., Lufkin Rule, Nicholson File, Norton Company, Producto

Center photo of general office shows inventory control equipment and tube system for sending orders to warehouse.

Photo at right (left to back to right) shows LAMAR COBB, District Manager, Whitman & Barnes; HARRY JASON, District Manager of Carboloy; R. L. HILL, President of Southern Tool Distributing Co.; JIM SWYGERT, Secretary & Treasurer of Southern Tool; CHARLES HARROP, District Manager, Brown & Sharpe, and NORM EKOLM, District Manager of Norton Co.

Machine Company, Taft-Pierce Mfg. Company, and Whitman & Barnes.

A feature of Southern Tool's system of importance to customers is the highly mechanized inventory control system, which gives finger tip information as to quantity in stock, price, rapidity of movement and restocking needs. Southern Tool's operations are supported by four outside and two inside salesmen.

Couplings



Idlers

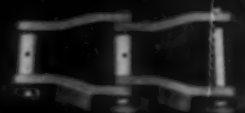


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Pillow Blocks



JEFFREY equipment and accessories

Chain for Drives,
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and Conveying

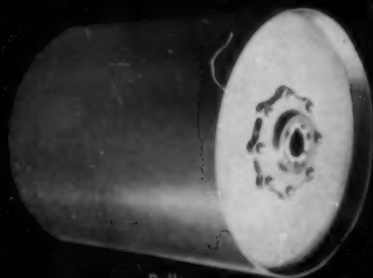
Take-Ups



Discharge Valves



Sprocket Wheels



Pulleys



Buckets



Spiral Flights

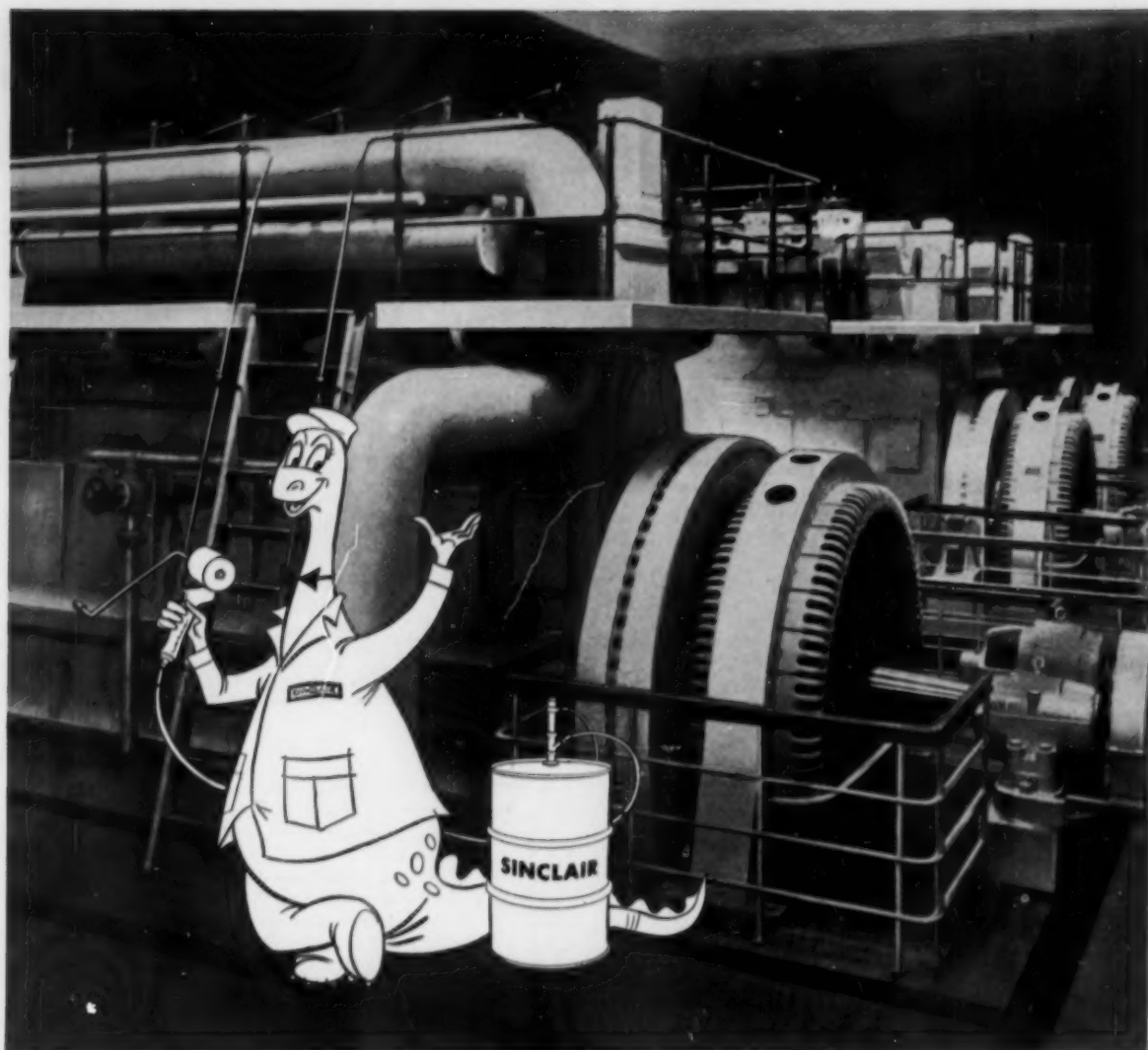
● Check the Jeffrey line when specifying parts or accessories for any of your materials handling jobs. Jeffrey products have been time-tested on original equipment and as replacements in all kinds of industrial applications. Their design, materials and workmanship are of the finest, assuring efficient, low-cost service.

Jeffrey transmission products are widely known for quality and dependability. Many of the most popular types of chain were originated and patented by Jeffrey and since have been adopted as standard throughout industry. Send for complete data. Distributors in principal cities. The Jeffrey Manufacturing Company, 898 North Fourth Street, Columbus 16, Ohio.



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less oil
consumption**

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Switch to Sinclair RUBILENE and lower your costs. Whatever the make or age of your Diesel, whatever your lubrication problem, there's a RUBILENE or RUBILENE HD Oil that should meet your requirements. Call your Sinclair Representative for further information or write for free literature to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. There's no obligation.

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Experienced coal users know that buying low quality coal is often a waste of money. But buying premium coal is an investment that pays off in greater efficiency, lower production overhead — more profits!

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Whether you use coal to produce heat, power or by-products, there's a type of Fuel Satisfaction to meet your specific needs *exactly*. For additional facts and advice, contact our coal specialists. There's no obligation.

*Fuel Satisfaction is the name given the many brands of superior all-purpose Bituminous Coal mined along the Norfolk and Western.

ROANOKE

N&W Coal Traffic Dept.
Telephone Diamond 4-1451
Ext. 313, 423, 249, 732
Roanoke, Virginia

BOSTON

833 Chamber of Commerce Building
Telephone Liberty 2-2229
Boston 10, Massachusetts

CHICAGO

Room 604, 208 South LaSalle Street
Telephone RAndolph 6-4634
Chicago 4, Illinois

CINCINNATI

913 Dixie Terminal Building
Telephone DUmbar 1-1325
Cincinnati 2, Ohio

CLEVELAND

1819 Union Commerce Building
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Detroit 26, Michigan

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St. Louis 1, Missouri

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Winston-Salem 1, North Carolina

Norfolk and Western RAILWAY

CARRIER OF FUEL SATISFACTION

Southern News Briefs — Continued



Atlanta Communication Center for Southeastern Operations of G-E

Mrs. Edna Taylor, Manager, shows Carter L. Redd, Southeastern Region Vice President of the General Electric Company, and A. W. Pledger, Western Union Division Manager, Atlanta, how messages come and go in General Electric's new communication center in the Western Union Building, Atlanta.

The new center is part of the largest leased telegraph network in American industry. Built to serve General Electric's greatly expanded facilities in the South, the center more than doubles the message capacity of the old switching center here and will be the nerve center of the network for North Carolina, South Carolina, Tennessee, Alabama, Georgia, Florida, Louisiana and Texas.

FUTURE EVENTS of Engineering Interest

Dec. 1-6: The American Society of Mechanical Engineers. Annual Meeting, Statler and McAlpin Hotels, New York, N. Y. Further information from ASME Meetings Dept., 29 West 39th St., New York 18, N. Y.

Dec. 2-6: 26th Exposition of Chemical Industries. New York Coliseum, New York, N. Y. International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

Jan. 27-30: 9th Plant Maintenance & Engineering Show. International Amphitheatre, Chicago, Ill.

Jan. 27-31: 2nd Annual Prestressed Concrete Short Course. Ellinor Village, Daytona Beach, Fla. Registration fee of \$10.00 with regis-

tration closing Jan. 1. Write Prestressed Concrete Short Course, Civil Engineering Dept., University of Florida, Gainesville, Fla.

Jan. 31: Oklahoma Regional Meeting. Natural Gasoline Association of America, Skirvin Hotel, Oklahoma City, Okla. William F. Lowe, Secy., Natural Gasoline Assoc. of America, 421 Kennedy Bldg., Tulsa 3, Okla.

Feb. 2-7: American Institute of Electrical Engineers. Winter General Meeting, Hotel Statler, New York, N. Y.

March 2-4: Southern Safety Conference & Exposition. Peabody Hotel, Memphis, Tenn. W. L. Groth, Executive Director, Southern Safety Conference, Inc., Box 8927, Richmond 25, Va.

March 17-19: American Power Conference. Chicago, Ill. R. A. Buden-

holzer, Director, Am. Power Conf., Illinois Institute of Technology, Chicago 16, Ill.

March 17-21: 4th Nuclear Engineering & Science Conference & Exposition. Chicago, Ill. For information write Atomic Exposition, 117 South 17th St., Philadelphia 3, Pa.

April 16-18: Natural Gasoline Assoc. of America. Annual Convention, Baker and Adolphus Hotels, Dallas, Texas.

April 28-30: American Institute of Electrical Engineers. Middle Eastern District Meeting, Washington, D. C.

May 12-16: Southwestern Metal Exposition. State Fair Park, Dallas, Texas. W. H. Eisenman, Mgr. Dir., 7301 Euclid Ave., Cleveland 3, Ohio.

May 13-15: American Institute of Electrical Engineers. East Central District Meeting, Huntington, W. Va.

Ryerson's Charlotte Steel Service Plant

Joseph T. Ryerson & Son, Inc., warehousing subsidiary of Inland Steel Company, has moved into their new \$1 million steel service plant at Mt. Holly and Chemway Roads, Charlotte, N. C.

The new modern plant will serve the eastern portion of Georgia and most of the State of Florida, along with North and South Carolina, offering well rounded stocks of bar, structural, plate, sheet and tubular steel. Sawing, shearing and flame cutting equipment is operated to produce steel precisely cut to the sizes and shapes required by customers.

Wilson A. Young is General Manager; Hiram A. Walker, Office and Credit Manager, Charles N. Benson, Inside Sales Manager, and Roger A. Derrough, Manager of Merchandise Inventory.

News Briefs About Your Equipment Manufacturers

Yuba Heat Transfer Division (formerly The Heat Exchanger Division of The Lummus Co.) has named George Evans vice president in charge of sales, and Robert A. Beck General Sales Manager.

G. E. Schlott is now president of the Diamond Chain Co.

...more quality proved **POWELL VALVES**

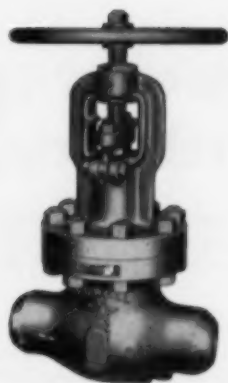


Fig. 6031S-WE—600-Pound Steel
Globe Valve for Steam Service.
Outside Screw Stem and Yoke.

Fig. 19003—Powell Steel Pressure
Seal Gate Valve for 900 Pounds W.S.P.

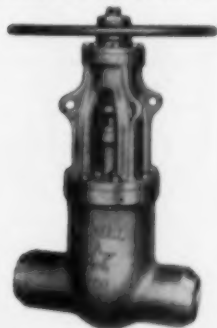


Fig. 1793—Iron Body Bronze
Mounted O.S. & Y. Gate Valve
for 125 Pounds W.S.P.

Fig. 2467—Small 300-Pound Stainless
Steel O.S. & Y. Gate Valve. For handling
boiler feed water treating solutions.



made with quality proved materials

Consult your Powell Valve Distributor for full facts about quality proved bronze, iron, steel, and corrosion-resistant valves. For every flow control problem—there is a Powell Valve to solve it... *better.*

THE WM. POWELL COMPANY, CINCINNATI 22, OHIO . . . 111th YEAR

Trouble-free operation of QC Boilers
SAVES TIME, LABOR and MONEY
for Staunton Military Academy!



Staunton Military Academy, Staunton, Va.



Battery of QC Boilers in service at Staunton.

Central power plant now operates with increased overall efficiency!

Boiler plant modernization has more than proved its worth at Staunton Military Academy!

During 1954, three 150 H.P. oil-fired Queen City "bent tube" water tube boilers were installed to replace three stoker-fired fire tube boilers.

This battery of QC Boilers has produced with ease the 10,000 lbs. of steam per hour required for the heating load!

The switch to QC Boilers has resulted in a total

lower cost of power plant operation, has eliminated costly maintenance problems and delivers quicker and more uniform heat throughout the multi-building institution.

For all-round boiler efficiency, install a QC water tube boiler in your plant. No matter what the fuel . . . oil, gas, coal, combination gas-oil . . . Queen City Boilers give you more steam, faster and drier, for less cost! Available from 300 to 17,500 lbs./steam/hr., up to 250 psi.

For complete information, write

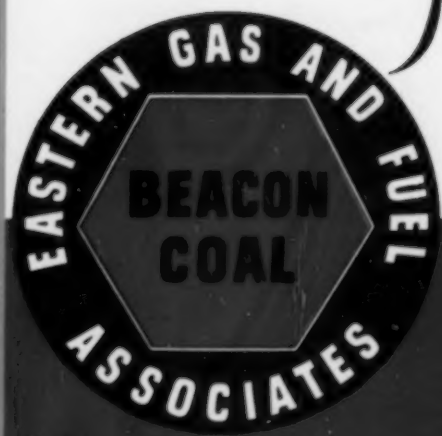


**Queen City
Engineering Co.**

P. O. Box 3103 CHARLOTTE • NORTH CAROLINA



Warmest Wishes for a Merry Christmas



EASTERN GAS AND FUEL ASSOCIATES

PITTSBURGH BOSTON CLEVELAND DETROIT NEW YORK NORFOLK
PHILADELPHIA SYRACUSE

For New England: New England Coal & Coke Co.

For Export: Consol., Curran & Bullitt, Inc.

Southern News Briefs — Continued



New Plant for Cocker Machine — Carolinas

Cocker Machine and Foundry Co., formerly of Gastonia, N. C., is now moved into complete new offices, and manufacturing is underway in the new plant. Located at Ranlo, near Gastonia, the new offices and manufacturing areas cover 90,000 sq ft on a 17 acre tract. The new offices cover about 9000 sq ft. Recent additions to the manufacturing area include 44,000 sq ft (light colored building).

SOUTHEAST now Second Largest in U. S. Output of Electrical Energy

Takes Lead in Rate of Increase in Production

In the 10-year-period following World War II, the seven Southeastern states have advanced from the fourth largest producer of electric energy regionally in the nation to the Number 2 position, according to the U. S. Department of Commerce.

The Southeast has also led the nation in rate of increase in the production of electric energy for utility and industrial purposes since the war. The West South Central section was second in percentage increase.

With all of the seven states of Alabama, Florida, Georgia, Mississippi, Tennessee and the Carolinas sharing in the gain, the region's advance of 249% from 1947 through 1956 was far ahead of the national average of 167%, the New England's 67%, the Middle Atlantic's 61%, the East North Central's 123%, the West North Central's 107%, the Mountain region's 100%, and the Pacific coast's 133%, and was also "safely" ahead of the 221% gain in the West South Central section.

Reporting results of an analysis of Federal Power Commission data, Merrill C. Lofton, Atlanta Commerce Department field manager, said last year 108.4 billion kilowatt hours of electric energy were produced in the seven southeastern states by utilities and industries, or more than three times more than the 31 billion kilowatt hours produced in 1947 right after World War II.

In the Southeast, gains of from 181% in Georgia and North Carolina to 851% in Mississippi were registered during the post-war years. In Alabama, the output of electric energy advanced from 7.3 billion kilowatt hours right after the war to last year's 25.2 billion, or 244%; Florida, 3.2 billion to 12.8 billion, 303%; Georgia, 3.5 billion to 9.7 billion, 181%; Mississippi, 367 million to 3.5 billion; North Carolina, 6.3 billion to 17.8 billion; South Carolina, 2.3 billion to 8.2 billion; and Tennessee, 7.8 billion to 31 billion.

Last year's 108.4 billion kilowatt hours produced in the seven-state southeastern area was the nation's second largest regional amount, being exceeded only by the 162 billion produced in the East North Central states of Ohio, Indiana, Illinois, Michigan and Wisconsin.

FLORIDA — Big Aircraft Industry in the Making

Airtronics International Corporation, following the continuous movement of the aircraft industry into Florida, has established operations in a 12,000 sq ft building at 2051 West Ninth Ave., Hialeah, Florida. Company will design and manufacture precision gears, plastic injection moldings, die castings, screw machine products and metal stampings. They will also offer electronic and mechanical engineering and drafting services to the aircraft industry and other types of manufacturing.

Aircraft and aircraft component manufacturers already established in Florida include: Martin Aircraft at Orlando; Pratt & Whitney in West Palm Beach; Radiation Incorporated at Melbourne; and General Electric and Minneapolis Honeywell in the Tampa area. There is also the proposed development of Hughes Aircraft.

Richardson Manufacturing Co. of Springfield, Ill., is also constructing a 45,000 sq ft heavy jig and fixture manufacturing plant at Orlando.

New Ceramic Tile Plant — Mississippi

Misceramic Tile is now producing both wall and floor ceramic tile in their new 60,000 sq ft, \$1,200,000 plant at Cleveland, Mississippi. Plant produces 20,000 sq ft of tile per day and employs approximately 150.

Production Manager is R. E. Hornberg. W. C. Hansard, professor of Ceramic Engineering at Georgia Tech, is Consulting Ceramic Engineer for Misceramic.

Kohler Co. Opens \$6 Million S. C. Plant

Vitreous china plumbing fixtures are now being produced in the new \$6 million Kohler Co. pottery plant at Spartanburg, S. C. Sam H. Davis, Jr. is Plant Manager and John R. Brown is Personnel Manager.

Mr. Davis was formerly superintendent of a pottery plant in Illinois and Mr. Brown was recently personnel manager of Glendale Mills, Glendale, S. C.

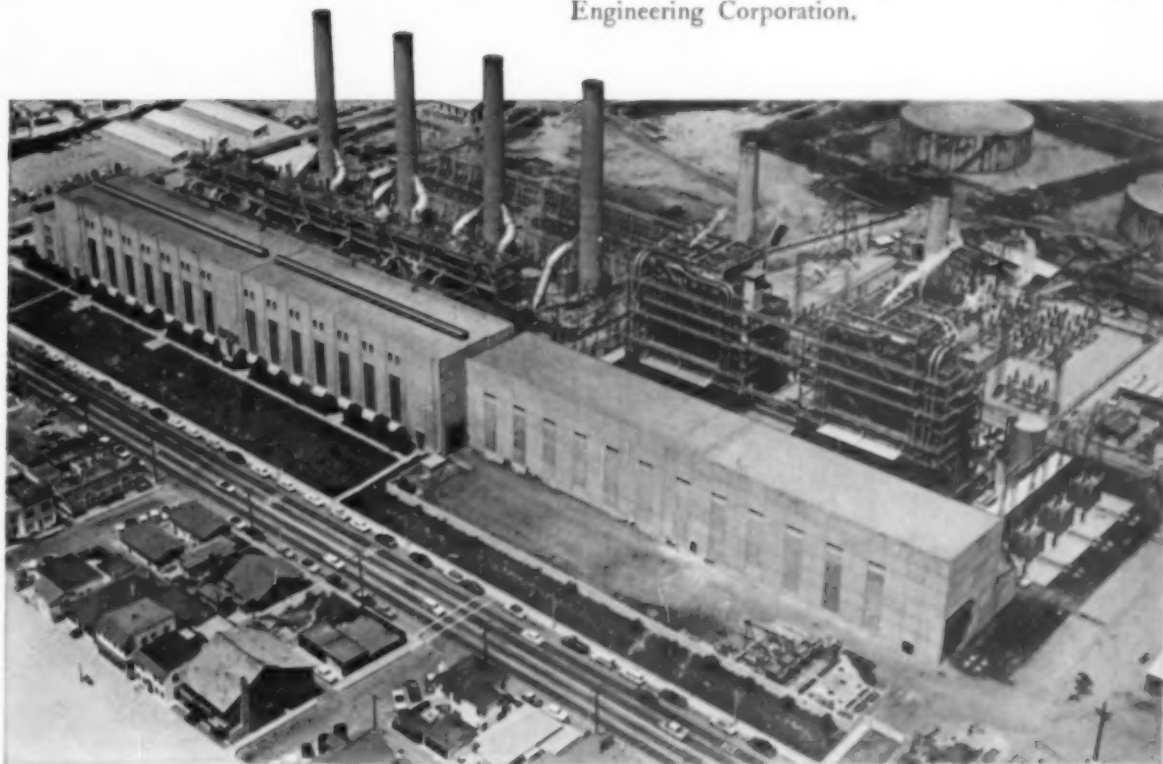
(Continued on Page 34)

RETURN TO REDONDO

Unit #6 of the Redondo Steam Station of the Southern California Edison Company went into commercial operation less than 22 months from the time Stone & Webster Engineering Corporation received authorization to proceed with design and construction.

This unit with a capacity of over 150,000 kw was designed to operate on gas and/or oil. Complete remote controlled furnace ignition and combustion control permits firing of Units #5 and #6 by either fuel from a centralized control room.

A second control room serves Units #1 through #4 in a similar manner. Together they permit effortless operation over a wide range of load at minimum operating cost. All six units were designed and constructed by Stone & Webster Engineering Corporation.

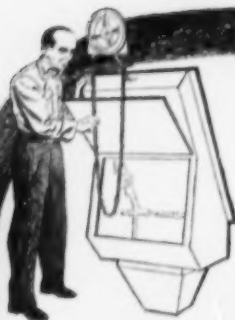


Write or call us for information as to how our experience may be of assistance to you.

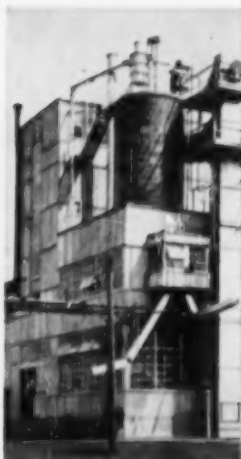
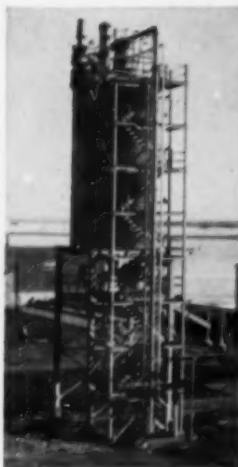


STONE & WEBSTER ENGINEERING CORPORATION
A SUBSIDIARY of STONE & WEBSTER, INC.

New York Boston Chicago Pittsburgh Houston San Francisco Los Angeles Seattle Toronto



100 ton Ash Silo straddling R.R. track with full stairway to roof. High capacity Ash Conditioner on open platform with discharge to R. cars.



Ash Silo constructed integrally with boiler house. Ash Conditioner mounted inside building. Bifurcated chute allows R.R. car or truck loading.



Ash Silo for truck loading with enclosed room for ash conditioner.

American Cyanamid Co.
American Gas & Electric Service Corp.
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Central State Hospital of Virginia
Chemstrand Corp.
Chicago Pneumatic Tool Co.
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National Distillers
Charles Pfizer Co.
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Public Service Electric & Gas Co.
Ravenna Arsenal
Riegel Paper Corp.
Rehm & Hous Co.
Square D Company
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U. S. Steel Corp.
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efficiency — rugged, wear-resistant pipe and fittings that provide lower maintenance cost per ton of ash conveyed. Consult *National* now — one contract covers everything, from inception to finished installation. Write us, or nearest representative listed below.

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Manufacturers of: **National ChipVeyer Systems** for the collection and processing of metal chips and borings and reclamation of cuttings oils—**Conveyors** for press scrap and small parts — **Pneumatic Systems** for handling dry granular materials.



At SPANG's Etna Plant, close control of heat, forming and welding conditions builds top quality into SPANG CW Steel Pipe.

Here comes your **SPANG** CW pipe order at 2,450° F!

Here is the most critical part of the manufacture of SPANG CW Steel Pipe. This is where steel skelp is formed and welded at high speed into a strong quality pipe for dozens of uses.

Three important things happen here to control the quality of the product:

- 1. Controlled heat**—To bring the steel skelp to the best temperature—2,450°F—for forming and welding; furnace heat is constantly regulated.
- 2. Controlled surface cleaning**—To provide a clean surface on both sides of the skelp, compressed air blows off dirt and scale before forming and welding.

- 3. Controlled pressures**—To assure uniformity and provide the best continuous welding results, welding train rolls are carefully positioned at specific settings to give proper pressure for making the weld.

This control is important to you!

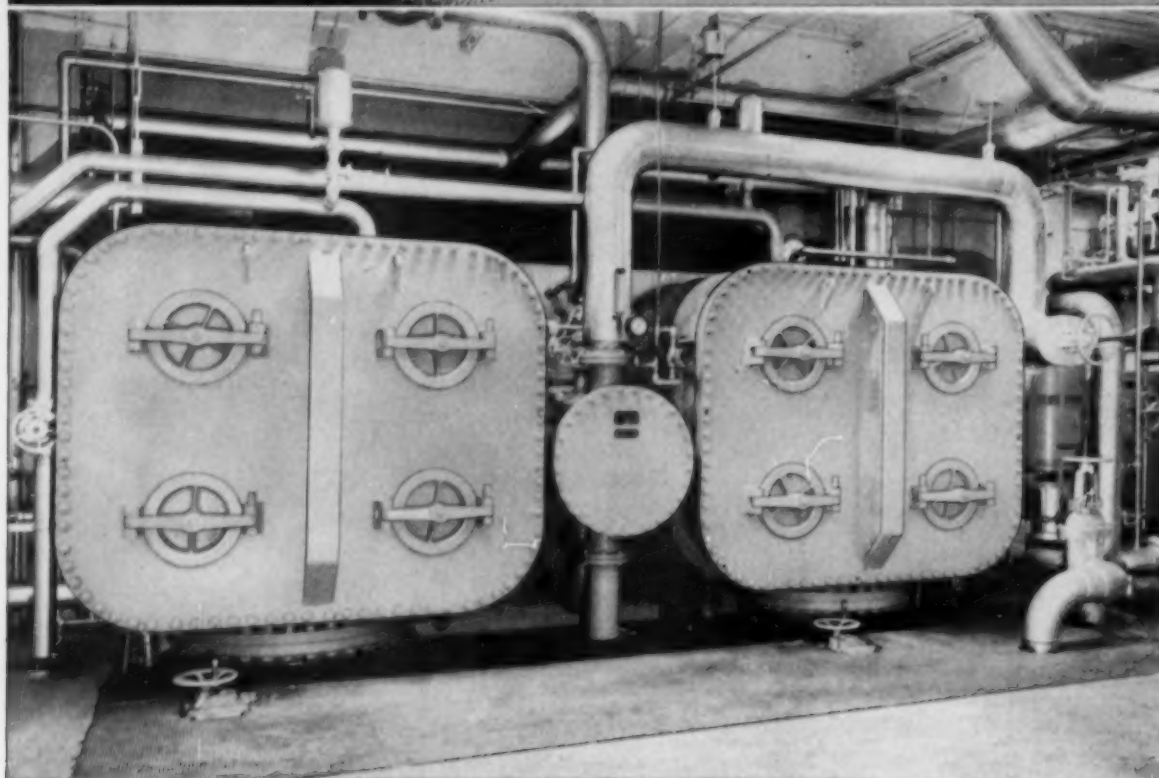
SPANG's careful attention to quality control produces for you a *top-quality* pipe that is easy to bend, cut, thread and weld . . . that saves you installation time . . . that offers your customers years of built-in service.

You just can't buy better steel pipe than SPANG CW. If you're not already using SPANG, try it on your next installation and see for yourself. Your nearby SPANG Distributor will be glad to serve you.

SPANG-CHALFANT
DIVISION OF THE NATIONAL SUPPLY COMPANY



General Sales Office: Two Gateway Center, Pittsburgh, Pa.
District Sales Offices: Atlanta, Boston, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis



NEW-DESIGN CONDENSERS SAVE SPACE AND **MONEY**

Steam generation of electricity has made tremendous progress in the last 25 years because of the ever-increasing efficiency of the equipment used.

A power equipment manufacturer with many "firsts" to its credit, Yuba is continually designing, among other equipment, condensers with low head room to save much-needed space. This advancement is illustrated above in the photograph of a rectangular shape condenser for the Suwanee River Plant of the Florida Power Corp.

A low pressure heater is installed between the

tube banks to further save plant space, as well as initial cost for foundation and piping. An additional design feature of Yuba condensers is a de-aerating section within the condenser shell which eliminates the main plant de-aerating heater. Maintenance and downtime costs are reduced by welding tubes into tube sheets.

For advanced condenser design, that will save space and money, consult the Yuba Heat Transfer Division, formerly the Heat Exchanger Division of The Lummus Co.

YUBA

CONSOLIDATED INDUSTRIES, INC.

Other Divisions Manufacturing Heat Transfer Equipment
California Steel Products Division, Richmond, Cal.
Adco Division, Buffalo, N. Y.

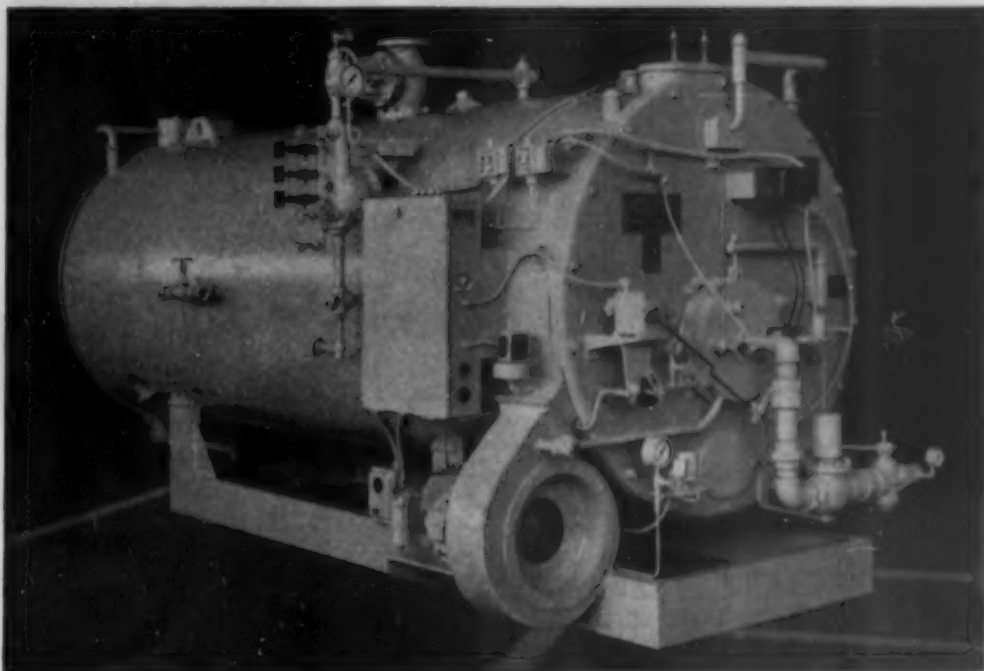
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FEEDWATER HEATERS • BAROMETRIC CONDENSERS

NEW

AMESTEAM GENERATOR

MODEL "R"



100 HP Model "R" AMESTEAM GENERATOR

We Kept Our PROVEN DESIGN We Added "ENGINEERED SIMPLICITY"

Retaining all the time-proven principles and benefits so much in demand in AMESTEAM GENERATORS, the new Model "R" brings you many important improvements.

For example, the proven design of the Ames Pressure Vessel is preserved . . . but improved. You'll still find all its reliability, efficiency and simplicity. But, in the Model "R" you'll enjoy these advantages in a much more compact "package" . . . and at a price that will please you.

The Model "R" AMESTEAM GENERATOR is now available in sizes from 10 to 150 HP for pressures up to 250 PSIG, for oil, gas or combination

oil-gas firing equipment. Quick fuel switchover is also available. Centrally-positioned auxiliaries and controls simplify your operating procedures.

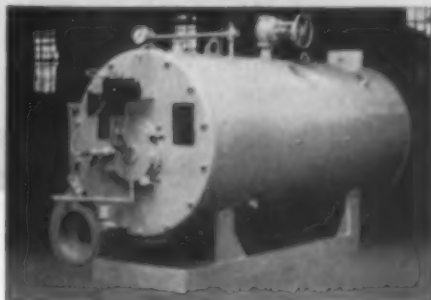
Like all AMESTEAM GENERATORS, the Model "R" is shipped to you in firing condition, completely inspected and equipped to comply with the local, state or insurance codes specified. All you need to do is connect it up and put it to work.

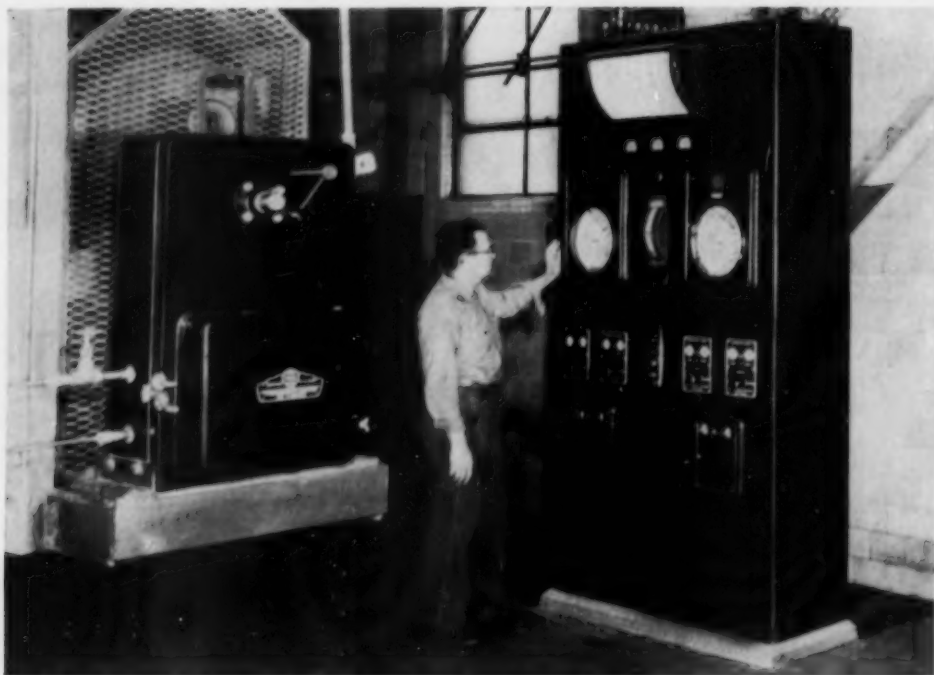
Investigate the many extra bonus features awaiting you in the new Model "R". Write us today for new Model "R" Bulletin and name of your nearby AMESTEAM representative.

- SURPRISINGLY COMPACT
Saves Floor and Operating Space
- GUARANTEED 80%
EFFICIENCY
- CENTRALIZED CONTROLS
Save Operating Time
- NEW FLEXIBILITY OF
INSTALLATION
- NEW EASE OF MAINTENANCE
Conserves Manpower

50 HP Model "R" AMESTEAM GENERATOR

AMES IRON WORKS, INC.
BOX L-127 • OSWEGO, N. Y.





This Bailey Control System helps cut fuel costs on a 70,000 lb per hr capacity 125 psi boiler in an industrial plant. Control drive in foreground regulates stoker.

How Bailey stretches your fuel dollar...

You can wring more energy out of a dollar's worth of fuel when you are getting optimum performance from your steam plant equipment. You get peak performance when Bailey Meters and Controls are on the job. They increase your plant efficiency.

Bailey is the choice of virtually all the most efficient plants on the Federal Power Commission's heat rate report. Here's why:

1. Complete Line of Equipment

You can be sure a Bailey Engineer will offer the right combination of equipment to fit your needs. Bailey manufactures a complete line of standard, compatible pneumatic and electric metering and control equipment that has proved itself. Thousands of successful installations involving problems in measurement,

combustion, and automatic control are your assurance of the best possible system.

2. Experience

Bailey Engineers have been making steam plants work more efficiently for more than forty years. Veteran engineer and young engineer alike, the men who represent Bailey, are storehouses of knowledge on measurement and control. They are up-to-the-minute on the latest developments that can be applied to your problem.

3. Sales and Service Convenient to You

There's a Bailey District Office or Resident Engineer close to you. Check your phone book for expert engineering control on your steam plant control problems.

AI32-1



Instruments and controls for power and process

BAILEY METER COMPANY

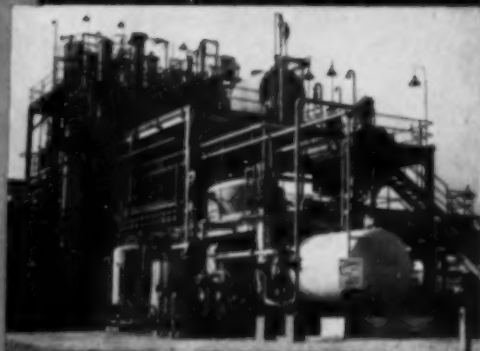
1028 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada — Bailey Meter Company Limited, Montreal

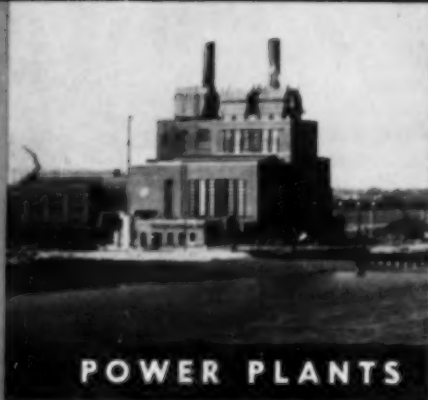
DROP FORGED STEEL valves, fittings and flanges by **Vogt**



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**USED
and TRUSTED
by the
NATIONS KEY
INDUSTRIES**

There are good reasons behind the trust which America's key industries have placed in Vogt valves, fittings, and flanges for half a century. They know that *drop forged materials* are uniform in structure, fine grained, and free from porosity. They know, too, and appreciate the meticulous care given these products through every stage of forging and machining in Vogt's modern shops, and about the many rigid tests and inspections. And that is why these products enjoy such an impressive record of performance in withstanding the shocks and stresses imposed by high or low pressures and temperatures and in resistance to erosive and corrosive conditions.

Service is another important factor in this confidence because Vogt maintains the world's largest and most complete stock of drop forged steel valves, fittings, and flanges always ready for immediate shipment.

Write for Catalog F-9.
Consult its 400 pages for
the complete Vogt line of
drop forged steel valves,
fittings, and flanges for oil,
steam, water, air, gas, and
refrigeration services.
Address Dept. 24A-F9



You'll want to look into this pump

NEW F-M POMONA WATER-LUBRICATED TURBINE PUMP

Here is an all-new, extra rugged pump designed from end to end with the cost-conscious user in mind. A close look at its strictly quality features reveals why it's recognized as today's top pump buy at any price.

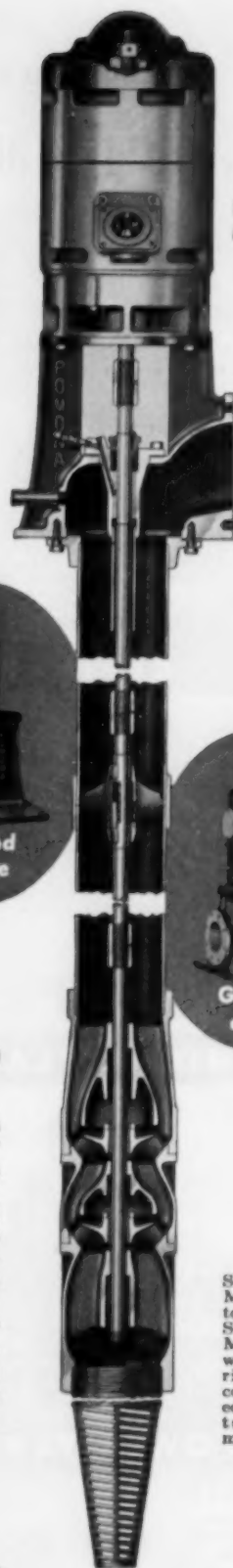
For ruggedness of construction, simplicity of maintenance, and strictly quality design throughout, this new F-M Pomona turbine pump is today's greatest value. No other pump is so easily installed, so easy to adjust for varying field conditions, so simple to change between electric, belted or geared drive.

Ask for details on this new F-M Pomona pump for raw water supply, air conditioning, refrigeration, cooling towers, sump pumping, dewatering, etc. Contact your Fairbanks-Morse Sales Engineer today. Ask for new illustrated Bulletin 6957-1. Or write Fairbanks, Morse & Co., 600 So. Michigan Ave., Chicago 5, Ill.



FAIRBANKS-MORSE

a name worth remembering when you want the BEST



F-M UNI-DRIVE
MOTOR



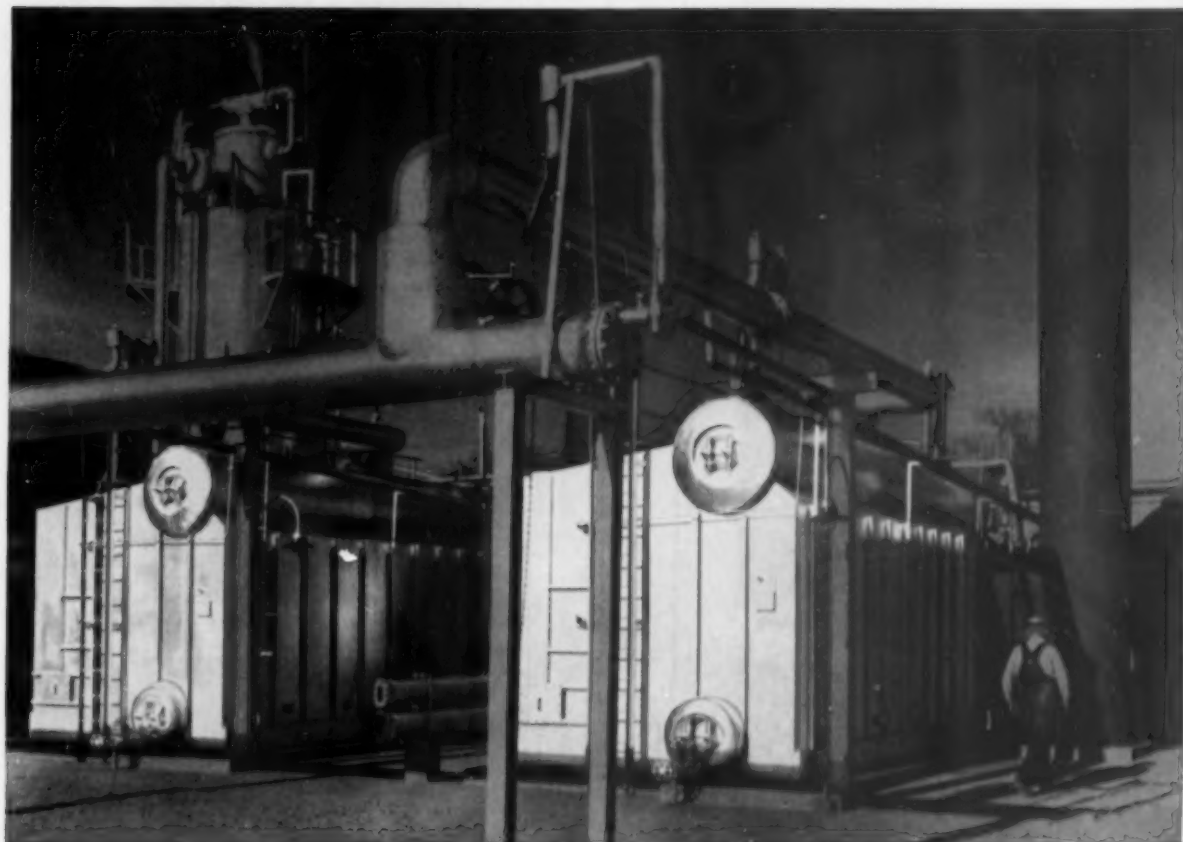
Belted
drive



Geared
drive

Seven Fairbanks-Morse pump factories in the United States, Canada and Mexico build the world's greatest variety of hydraulic combinations offered by any manufacturer of liquid-moving machinery.

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS



PACKAGED STEAM by FW

helps load more than
7,000,000 gallons of oil
in less than 3 months



WHEN U. S. refiners recently were required to meet a sudden, extended demand from Europe for oil, one of the key points of supply was the Magpetco Terminal of Magnolia Petroleum Company. With storage capacity for some 4½ million bbl of petroleum products, this southeastern Texas tank farm was a "natural" for emergency use as a crude oil outlet point — 7,000,000 gallons of crude oil were loaded in less than 3 months.

The two Foster Wheeler Packaged Steam Generators shown above not only met all the normal load requirements but demonstrated ample reserve capacity for emergencies. They provided a reliable source of steam which was essential to operate the

many large reciprocating pumps and to heat heavier oil in the storage tanks to facilitate pumping.

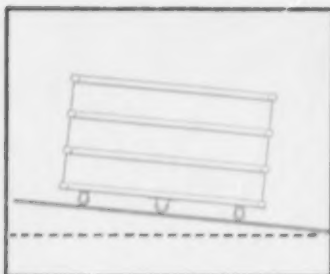
Chosen by Magnolia engineers to replace outmoded steam equipment at the terminal, the units are installed outdoors. Casings are of all steel welded construction with weatherproof insulation over the drum ends. Each unit delivers 30,000 lb of steam per hour at 150 psi. Dimensions are: 10' x 28½' x 12' high.

FW Packaged Steam Generators are available in capacities from 10,000 to 62,500 lb/hr and pressures to 1300 psi. For complete information, send for Bulletin No. PG-55-3. Foster Wheeler Corporation, 165 Broadway, New York 6, N. Y.

FOSTER WHEELER

NEW YORK • LONDON • PARIS • ST. CATHARINES, ONT.

4th
FLOOR
SPINNING
ROOM



Platform tilts as elevator doors open when car has been "DISPATCHED" for unloading



Elevator platform tilts for automatic unloading



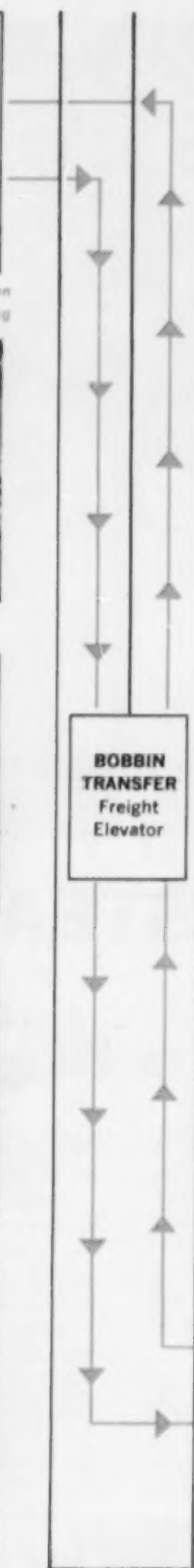
Truck starts to roll forward



Truck continues to roll forward



Truck picks up momentum on landing incline



BOBBIN
TRANSFER
Freight
Elevator



Elevator platform is tilted to unload trucks automatically



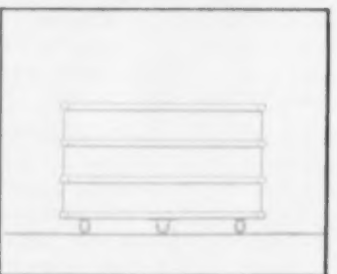
Elevator is dispatched as soon as loaded



Elevator loading begins immediately



Elevator platform remains level



Platform stays level as elevator doors open when car arrives "ON CALL" for loading

1st
FLOOR
WEAVING
ROOM

OTIS ELEVATOR COMPANY • 260 ELEVENTH AVENUE • NEW YORK 1, N. Y.

TILTING PLATFORM

on automatic Otis Freight Elevators
saves cost of operators at



The BEMIS BRO. BAG CO. COTTON MILL, Bemis, Tennessee is a typical cotton mill. It spins on the 4th floor and weaves on the 1st floor. It also has a typical cotton mill problem. Bobbins have to be moved continually between the 4th and 1st floors. The traffic flow is constant but not intensive enough to warrant the expense of freight elevator operators.

BEMIS has a "bobbin" transfer elevator at each end of its mill.

To provide better service and eliminate the cost of six elevator operators, OTIS, working with BEMIS designed an automatic elevator with a tilting platform. Its operation is explained at the left.

Here's the sequence of "bobbin" transfer: When the "doffer", who is the employee that takes the full bobbins off of the spinning frames on the 4th floor, gets a full box he takes it to the elevator and presses the "CALL" button for the 4th floor. If the elevator is already there the hoistway doors and car gates open and he loads the box or boxes into the car. He then closes the power-operated doors and gates by means of the door close button located outside. He next dispatches the car to the 1st floor. When the car arrives the doors and gates open and the platform tilts and rolls the boxes out of the car. Boxes are returned from the 1st floor to the 4th floor in the same manner.

An important working feature is OTIS automatic self-leveling. Elevator and floor platforms must be accurately aligned because of the small wheels on the bobbin trucks. Otherwise the free roll-off would be affected.

All freight elevators at BEMIS' plants in Bemis, Tenn. and Talladega, Ala. are under OTIS Maintenance. They're kept running at their original efficiency for a fixed monthly charge. There's never an unexpected, expensive repair bill. All replacements of wearing parts are included in the basic OTIS Maintenance Plan.

FREIGHT ELEVATOR maintenance

that keeps freight elevators running like new



"ENGINEERED SERVICE
BY THE MAKER"

OFFICES IN 297 CITIES ACROSS THE UNITED STATES AND CANADA



Here's all it takes

TO CONVERT THIS NEW WESTINGHOUSE COMBINATION LINESTARTER FROM NON-FUSED TO FUSED!

or change fuse clip ratings from 30 to 400 amp

This is flexibility!

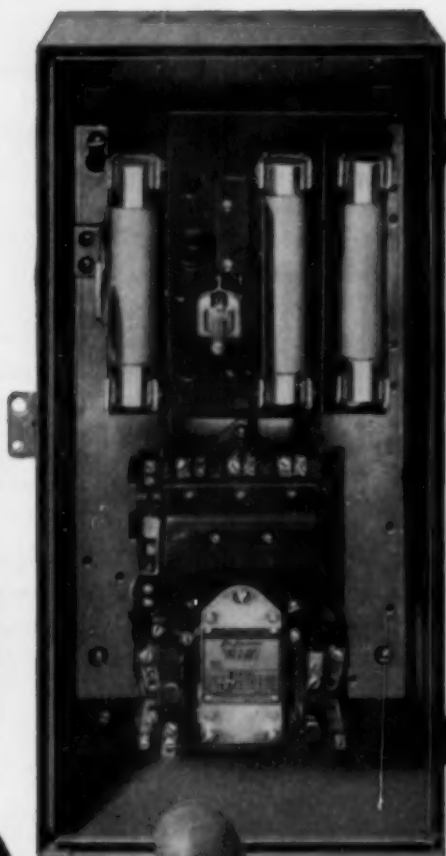
This is the new Westinghouse combination Life-Linestarter® with the Visi-Flex switch! . . . the convertible switch that enables you to modify the new Westinghouse combination linestarters (in sizes 0 through 4) to meet both your present and future power requirements by simply adding or changing a set of fuse clips.

All it takes is a screwdriver, a Westinghouse Fuse Clip Kit, and about five minutes of your electrician's time to change from non-fused operation to fusible, or to vary fuse ratings from 30 through 200 amps 600 volts, and 400 amps 250 volts, over a range of four switch sizes.

What's more, the new Westinghouse Life-Linestarters with Visi-Flex switch are up to 25% smaller than the old design—good news for plant engineers with a space problem.

For plants which face adverse operating conditions involving lint, dust, or oil seepage, the new linestarters are available in the NEMA-12 dust-tight enclosure, as well as the standard NEMA-1 shown at right. And—they're available now, from local warehouse stocks. Simply call your nearby Westinghouse sales office or distributor.

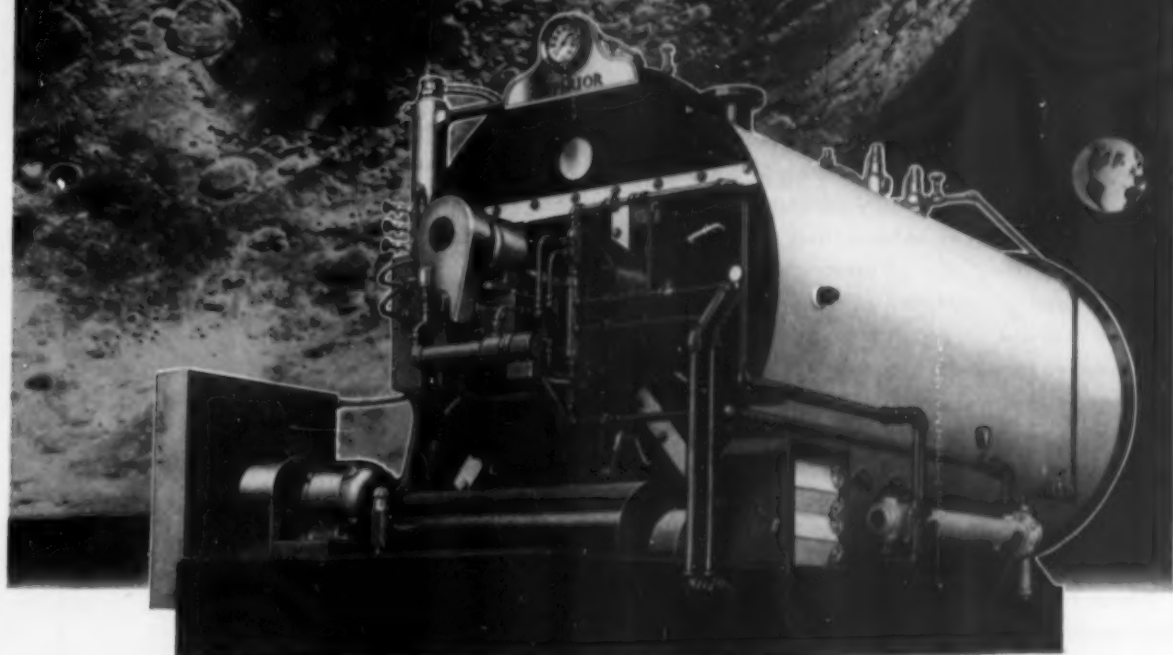
J 30284



YOU CAN BE SURE...IF IT'S **Westinghouse**



man may reach the moon
before you replace the boiler you buy today



... for LOW COST STEAM TOMORROW
buy a SUPERIOR STEAM GENERATOR TODAY



Superior Steam Generators encompass the most complete line of packaged boilers available. Write for complete details today.

Fire Tube types to 600 b.h.p. (Write for Catalog 711 F).

Water Tube types to 45,000 lbs./hr. (Write for Catalog 711 W).

Man will reach the moon . . . tomorrow perhaps . . . but more than likely "tomorrow" in the dictionary of scientists means 20 years . . . and that's a long time to pay the penalty of high steam costs. A boiler is a long term investment; and the equipment you buy today determines your steam costs for years to come.

Superior Steam Generators are designed and built to last longer, and to operate at higher efficiencies throughout their entire serviceable life. Evidence of this you can see for yourself in Superior's bigger, heavier construction and completely integrated design. Superior Steam Generators provide more steam per dollar over a longer serviceable life.

for performance you can BANK on

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 36, N.Y.

SUPERIOR
STEAM GENERATORS

MODERN OIL AND GAS FIRED BOILERS

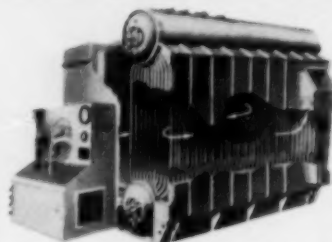
The boilers illustrated here cover the broad capacity range from 4,000 to 600,000 lb of steam per hr. They are all especially designed for gas and/or oil firing. The two units illustrated at right (Types VP and VU-55) are standardized and each is available in several sizes. The capacity range covered by these two units is from 4,000 to 120,000 lb per hr. The two units below are custom designed for various capacity, pressure and temperature requirements up to 600,000 lb per hr, 1400 psi and 950 F. All these units are pressure fired and do not require induced draft fans.

Collectively, they offer an exceptional diversity of choice. A brief consideration of the features of each type will help you "pinpoint" the design characteristics best suited to your particular needs.

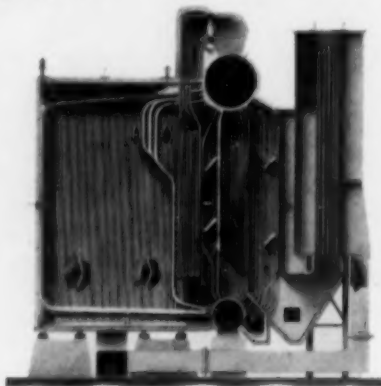
Of course there are other C-E two drum Vertical-Unit Boilers available for pressures up to 1400 psi and temperatures up to 960 F. Shown here are but four popular members of the C-E family of Vertical-Unit Boilers—a family which has achieved a wide measure of acceptance using all types of fuel.

Please feel free to call on us for further detailed information. Catalogs are available upon request.

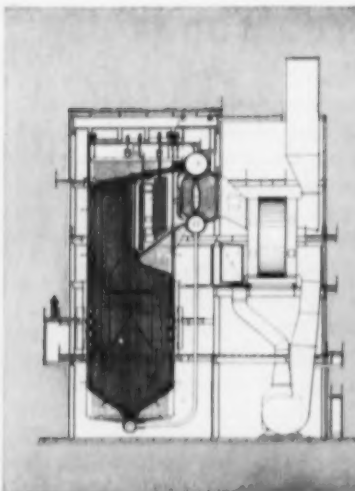
B-927 A



C-E Package Boiler — Type VP Completely shop assembled . . . available in fourteen sizes from 4,000 to 50,000 lb capacity . . . pressures to 300 psi. Available with integral console control panel, this unit contains more water-cooled area per cubic foot of furnace volume than any other boiler of its size and type. It can be equipped with any of several approved burners.

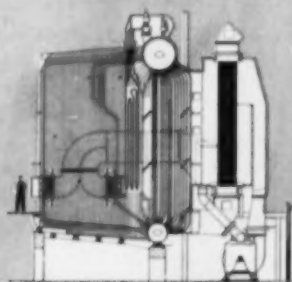


C-E Vertical Unit Boiler — Type VU-55 Available in six sizes . . . capacities from 50,000 to 120,000 lb steam per hour . . . designed for two pressure ranges, 250 psi and 300 psi, and total steam temperatures up to 750 F. This double cased, gas-tight unit is equipped with tangential burners. A large (60-inch) steam drum assures generous water capacity and steam reservoir space. Tangent tube waterwalls offer complete furnace protection, minimizing maintenance.



C-E Vertical Unit Boiler — Type V3

This unit is available for capacities from 200,000 to 600,000 lb per hr. It can be designed for pressures up to 1400 psi and for temperatures to 950 F. Tilting tangential burners, providing superheat control, are standard equipment although horizontal burners are available, if desired. A double, gas-tight casing assures lifetime tightness and minimum heat loss. Heat recovery equipment can be furnished as desired.



C-E Vertical Unit Boiler — Type VU-508

This unit is available for capacities from 50,000 to 400,000 lb per hr—pressures to 1400 psi and temperatures to 950 F. This bottom-supported design uses tilting tangential burners providing effective superheat control. Horizontal burners can be furnished if desired. Heat recovery equipment as required. This unit makes available to industrial installations a standard of performance comparable to utility practice.

COMBUSTION ENGINEERING

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200 Madison Avenue, New York 16, N. Y.



Steam Generating Units • Nuclear Reactors • Paper Mill Equipment • Pulverizers • Flash Drying Systems • Pressure Vessels • Home Heating and Cooling Units • Domestic Water Heaters • Soil Pipe

Modernize with EHR SAM Electric Elevators and Belt Manlifts

Safe, low-cost installation and operation that will improve employee efficiency up to 50%. This inter-floor transportation is economical for any plant with two or more stories.

All components factory assembled and pretested for easy installation. Standard speed of Electric Elevators is 90 ft./min.; for special applications speeds of from 50-120 ft./min., are available. Standard speed of Belt Manlifts is 75 ft./min.; for special applications speeds of from 50-80 ft./min., are available.

Ehram Electric Elevators and Belt Manlifts conform to the requirements of the American Standard Safety codes, all local and state codes.

ELECTRIC ELEVATORS

Push-button, car-type for 1 to 6 passengers. Easy to run, inexpensive to install and operate.

BELT MANLIFTS

Step-on type vertical endless belt manlifts for simultaneous traffic in both directions.

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Manufacturers of complete line of elevating, conveying, and power transmission equipment.

FOR VOLTAGES UP TO 600...

There's a *Safe and Dependable* **BUSS Fuse or FUSETRON Fuse** to fit the needs of every user

If you want Plug Fuses . . .

Use BUSS Clear Window Plug Fuses

Their one-piece body and "safety" design guarantees protection.

They are most convenient to use too, because real big windows and white backgrounds permits entire fuse strip to be seen. Even in poor light a blown BUSS fuse is easy to find.



If you want to reduce blowing of Plug Fuses . . .

Use FUSETRON dual-element Plug Fuses

FUSETRON Plug fuses protect like ordinary fuses against short-circuits and overloads — but unlike ordinary fuses they won't blow on motor starting currents or other harmless overloads.

They are the type of fuses recommended in the 1953 National Electrical Code.



If you want to make safe protection **REMAIN SAFE** as well as **REDUCE** blowing fuses . . .

Use BUSS Fustats (have Type S base)



FUSTATS like Fusetron Fuses have a dual-element and therefore, stop needless blowing — and they do more.

They have a type S base that prevents anyone from replacing them with a penny or substitute — or using a size too large to protect.

FUSTATS fit standard plug fuse holders by means of an inexpensive adapter that locks in place and needs never to be replaced.

To protect motors and apparatus of voltages up to 125 against burnout . . .

Use 0 to 14 amperes BUSS Fustats



A FUSTAT of the proper size installed to handle only the motor current will reduce to a minimum the chance of a motor burnout from an excessive over-current. In like manner it will protect solenoids, coils and transformers against burnout.

FUSTATS have the same degree of Underwriters' approval for both motor-running and short-circuit protection as the most expensive devices made. They give all the protection it is possible to obtain with any device on the market.

FUSES! . . . THE SAFEST AND MOST DEPENDABLE PROTECTION YET DEvised!

A fuse has just one vital part — a thin narrow strip of fuse metal. When the heat of a short-circuit is applied, the fuse link must melt and open the circuit.

The high speed operation of the fuse reduces to a minimum the danger of short-circuit damage to wiring and equipment.

Fuses offer dependable protection over the years.

The fuse link is sealed in. Dust can't get at it. Corrosion or oxidation can't increase its capacity or lengthen its blowing time.

There are no hinges, pivots or contacts to stick or get out of order.

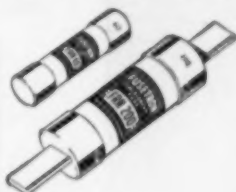
Millions of fuses have been in operation 30 years or more, because there has been no trouble on the

Play Safe! Install BUSS Fuses or

If you want fuses that — abolish all needless blows, stop overheating in panels and switches, protect motors against burnouts . . .

Use FUSETRON dual-element Fuses

With rare exceptions, ordinary fuses or circuit breakers do not protect except against short-circuit but FUSETRON fuses provide TEN POINT protection.



1. Protect against short-circuits.
2. Protect against needless blows caused by harmless overloads.
3. Protect against needless blows caused by excessive heating — lesser resistance results in much cooler operation.
4. Provide thermal protection — for panels and switches against damage from heating due to poor contact.
5. Protect motors against burnout from overloading.
6. Protect motors against burnout due to single phasing.
7. Give DOUBLE burnout protection to large motors — without extra cost.
8. Make protection of small motors simple and inexpensive.
9. Protect against waste of space and money — permit use of proper size switches and panels.
10. Protect coils, transformers and solenoids against burnout.

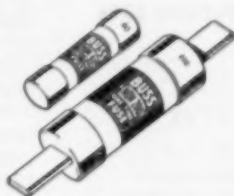
FUSETRON dual-element FUSES save you time and money because they are made to PROTECT — not to blow.

If you want Non-Renewable Fuses . . .

Use BUSS One-Time Fuses

They save you time and trouble because they get the same engineering care in manufacture as do all products carrying the BUSS Trademark.

Every BUSS One-Time fuse can be depended upon to operate as intended under all service conditions.



circuits they are protecting and therefore no occasion to open.

Yet, after years of inactivity, you can be sure the fuse will give the same safe, dependable protection if called upon to open as it would have on the day it was installed.

NO RECALIBRATION COSTS

When Fusetron fuses do blow, there is no recalibration needed. As quickly as the fault in the circuit is corrected, you slip in a new fuse that has been CALIBRATED AT THE FACTORY BY ENGINEERS — a fuse that is as safe and dependable as the one that blew.

Fusetron Fuses Now!

THROUGHOUT THE ENTIRE ELECTRICAL SYSTEM

If you want Renewable Fuses . . .

Use BUSS Super-Lag Renewable Fuses



The big advantage of these fuses over all other renewable fuses comes from the prevention of useless interruptions of service caused by needless blows.



The reason for this performance is found in the design of the fuse-case which assures good contact on the fuse link, even if the fuse is renewed by an inexperienced person — and by the time-lag built into the link that prevents the fuse from opening on motor starting currents or other harmless overloads.

If you want SAFE protection on loads above 600 and up to 5000 amps . . .

Use BUSS Hi-Cap Fuses

On voltages up to 600, high speed operation on heavy shorts limits current to safe values. This minimizes damage to equipment and cuts down dangerous stresses on transformers.



For Short-Circuit Protection or when fast opening is desired . . .

Use BUSS Limitron Fuses

The extremely fast opening characteristics of these fuses prevent heavy short-circuit currents from building up under fault conditions.



For protection of TV, Radio, Instruments, Radar, Avionics and Electronic Equipment . . .

Use BUSS and FUSETRON Small Dimension Fuses



A complete line is available. Made in Dual-element (slow-blowing), Renewable and One-Time types in sizes from 1/500 ampere up.

And there is a companion line of BUSS Fuse Clips, Fuse Blocks and Fuse Holders to take them.

FOR MORE INFORMATION ON BUSS AND FUSETRON FUSES WRITE TO:
BUSSKOHN MFG. DIVISION
MCGRAW-EDISON CO.,
ST. LOUIS 7, MO.



For Everlasting Protection in Emergencies



OPENING TYPE

to divert water to sprinkler deluge or water curtain systems, or to divert inflammable liquids to a point of safety.



CLOSING TYPE

to shut off the flow of inflammable liquids or to concentrate water or steam in fire mains.

Both types can be controlled thermostatically, electrically, or manually from any or many locations. Their design assures positive, dependable protection because they do not wedge and consequently cannot stick.

EVERLASTING

EVERLASTING VALVE CO.

53 FISK STREET, JERSEY CITY 5, N. J.

Valves

Southern Manager for Kelite

Lawrence W. Cunningham has been promoted to Southern Region Sales Manager by Kelite Corporation, manufacturer of industrial chemicals and steam cleaning equipment.



Mr. Cunningham joined Kelite in September, 1956, as Dallas, Texas, District Sales Manager. Prior to his appointment, he was associated with Oakite Products, Inc., as Technical Service Representative. His background includes experience in the petroleum and petrochemical industries.

Mr. Cunningham will be in charge of Kelite sales in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas and part of Kansas and Missouri. He will make his headquarters in Beaumont, Texas, where he resides.

Texas Instruments

Appointment of Robert W. Olson as vice president-research and engineering of Texas Instruments Incorporated, and E. O. Vetter as general manager of TI's Industrial Instrumentation division at Houston, was recently announced by P. E. Haggerty, executive vice president.

Mr. Olson, a vice president of Texas Instruments from 1951 to 1953, returns to the executive staff after serving nearly four years as head of the Industrial Instrumentation division.

In his new position, Mr. Olson will direct the planning and coordination of TI's research and engineering activities, especially on the long-range basis. Dr. Gordon K. Teal, assistant vice president, continues as director of research in charge of the company's central research laboratories.

(Continued on Page 110)

Building "A Case for the future"

Cleveland's Case Institute
approves GILSULATE® for
underground hot pipe insulation



Major Expansion Program at Case Institute, leading Midwest technical center, includes plans for several new buildings. GILSULATE has been used and approved by Case on these projects.



300-Foot Replacement Line for existing buildings. Case is replacing all lines with GILSULATE. Thus far, 1900 feet of GILSULATE-protected steam and return lines are on the Case campus.



Pouring GILSULATE is a simple job. Plywood forms conserve material. This is a close-up of the pipe run shown at the left. No special equipment is required during handling.



Shovel Pointing works GILSULATE between and under the pipes, filling all the voids. GILSULATE is ideal for use under roads and pavements, has a high load bearing capacity.



Tamping is the next step. It firms the GILSULATE bed prior to curing. Backfilling, seen in the overall view, is the final step. Few men are needed on a GILSULATE job.



Two-year-old Line on Case campus, dug up for experimental purposes, shows pipes to be in perfect condition, with intact GILSULATE protective structure.

Facts about Gilsulate

1. EASY TO USE—just pour and tamp...pipe heat does the rest.
2. FORMS 3 ZONES of protection against heat loss and all hazards commonly encountered by hot buried pipes.
3. NEEDS NO HOUSING OR MECHANICAL SHEATHS: no mixing, special handling or equipment.
4. ONLY NEEDS NORMAL PIPE SPACING: for multiple pipe or cramped conditions.
5. THREE TYPES AVAILABLE:
Type A for 220°-300°F temp. range
Type B for 300°-385°F temp. range
Type C for 385°-520°F temp. range

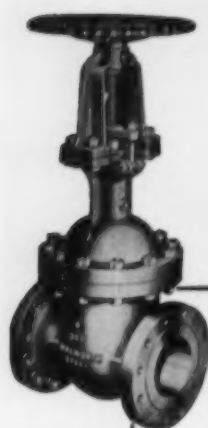


The Triple Zone Insulation System for Lifetime Protection of Underground Hot Pipes

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GILSULATE Insulation,
write any of our offices:

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Affiliate of Barber Oil Corp. & Standard Oil Co. of Calif.
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WALWORTH

Cast Steel Gate Valves

Series 150 and 300

Wedge Gate — Outside Screw and Yoke

Big 8-Point Superiority!



Sectional view of Series 300

Gland clearances are such that stem cannot be scored if gland should be tightened unevenly.

Deep Stuffing Boxes in all sizes (2" to 24") insure tightness and maximum packing life — costly leaks are eliminated.

Bonnets and Bodies are engineered to withstand pressure and minimize distortion — they're tough, durable, dependable.

Heavy Steel Walls provide extra strength and longer life.

Integral Body Guide Rib Faces are machined to insure accurate disc seating.

Seat Rings are bottom seated — not flange type. No recess exists at back of ring — hence no turbulence, erosion, or pressure drop.

Streamlined Ports allow high velocity, non-turbulent flow, and reduce the possibility of erosion.

Valves regularly have flanged ends. They can be supplied with ends for butt welding. Roller bearing yokes are available. On valves 5 inches and larger, by-passes can be furnished.

For Series 600 and higher, we recommend Walworth Pressure-Seal Steel Gate Valves.

For further information on Walworth Cast Steel Gate Valves, see your local Walworth distributor, or write:

WALWORTH

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valves • fittings • pipe wrenches

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ALL IN A DAY'S WORK at *Pittsburgh Piping*

Every Pittsburgh Piping job is different, but all are alike in one respect . . . to control the flow and harness the energy of high temperature steam, gases, or liquids at high pressures. It's all in a day's work at Pittsburgh Piping to fabricate piping for a central station, an atomic energy installation, or for industrial and processing operations. Our service includes every phase from blueprint through erection: engineering, metallurgical control, pipe bending, machining, welding, heat treating, inspection, and testing. Use these facilities on your high temperature, high pressure piping jobs.

this BIG 10-TON EXPANSION JOINT

36" carbon steel joint, weighing ten tons, for cross-over piping in central station.



and this small PRESSURE RISER CONDENSER

Pressure riser condenser, fabricated of Stainless Steel Type 347; 2 feet high; wall thickness equivalent to 4" Schedule 160S. Stainless steel pressure vessel, for atomic energy application, appears in background.



Promoting Progress IN POWER AND PROCESS PIPING

Pittsburgh Piping

AND EQUIPMENT COMPANY

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PP-30

Put plant traffic on a safe road with strong, easy-to-erect Armco Guardrail



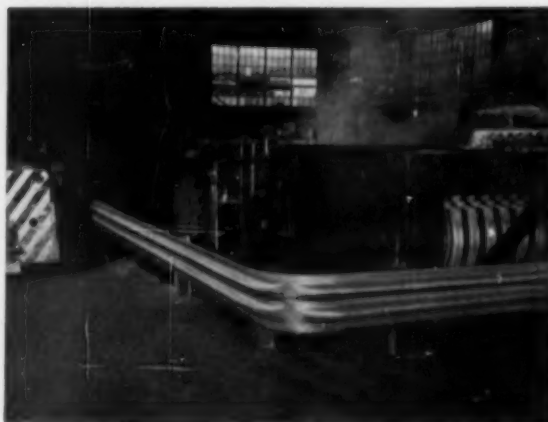
Armco FLEX-BEAM Guardrail installed in a parking lot at Bendix Products Division, Mishawaka Plant, Mishawaka, Indiana. Note stall markings on the rail. No danger of wearing off and they are easy to see, even with snow on the ground.

Protects Machines and Equipment; Guides Traffic, Promotes Safety

You can use highway-tested Armco FLEX-BEAM® Guardrail to add safety and convenience to plant traffic. The cost is low.

FLEX-BEAM is a beam-type, deep corrugated steel rail (10 or 12 gage) that resists severe impact, yet flexes slightly to cushion the shock of a collision. You can attach it easily to almost any kind of post. Eight bolts join 12-foot sections. Maintenance is no problem. An occasional painting keeps FLEX-BEAM highly visible. The corrugated surface reflects light from any direction.

Put Armco FLEX-BEAM Guardrail to work inside and outside your plant at key points like plant entrances, parking lots, aisleways, structural supports for your buildings, and around valuable machinery and equipment. Write us for complete information.



Wandering trucks cannot damage this important production equipment. FLEX-BEAM provides complete protection. Guardrail also makes definite separation of work area and busy traffic aisle.

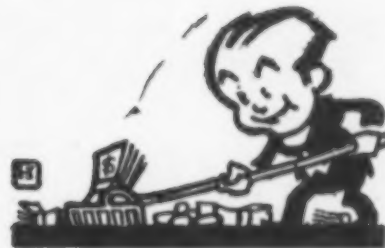
ARMCO DRAINAGE & METAL PRODUCTS, INC.

DIXIE DIVISION
619 Forsyth Building • Atlanta, Georgia
SOUTHWESTERN DIVISION
C&I Life Building • Houston, Texas
Other Offices in Principal Cities

Armco FLEX-BEAM Guardrail



MANAGEMENT CLINIC



Conducted by ROBERT H. EMERICK, North Charleston, S. C.

Question

WE HAVE been having complaints from dealers that our employees are not meeting obligations for merchandise bought on the installment plan. These dealers feel that our company should put pressure on the delinquents to pay up.

Our personnel department is inclined to go along with the merchants and every time a complaint comes in, the employee is sent a letter that orders him to satisfy the complainer, or face possible discharge.

The men resent the letters. They consider their doings away from work to be their own business, and object to the company acting the part of a collection agency.

We in the supervisory group would like to know if other companies follow similar practices. We would like also to have suggestions from the Clinic on how to handle this problem.

Suggestion

Most companies take a serious view of employees going into debt so deeply they cannot meet obligations. An employee who is worried over his debts is tempted to become either dishonest or unethical. Also, every employer wants his employees to help maintain good public relations.

The threat of discharge, is regarded by the Clinic as a last resort, to be reserved for repetitive offenders only. In fact, a "pay up or else" attitude actually encourages merchants to be over liberal by practically guaranteeing payment.

Over-buying means excessive debts and easy credit intensifies the problem. The Clinic offers these suggestions:

1. As a company, decline to function as a collector, and discontinue the "pay up or else" letters. Employees will then find credit harder to get and responsibility for checking a customer's ability to pay will return to the seller, where it belongs.
2. Promote credit union membership as a means for controlling installment buying. Indicate how it brings cash benefits.
3. By means of talks, articles in the house organ, and notices on the bulletin boards, teach employees what percentage of their income they may safely devote to installment buying. Leadership in this effort should come from employees and first step supervisors, rather than management.
4. Establish a "Finance Board," composed of three employees (one of whom functions as Chairman). The board should investigate debt complaints, and help employees work out of financial predicaments.

Have all complaints turned over to this Financial Board by the company management, and encourage employees to consult the Board before accepting any major obligation. The Board should be strictly an advisory body and should have no authority to discharge or to discipline.



With Valves . . . there's nothing like the silent treatment!

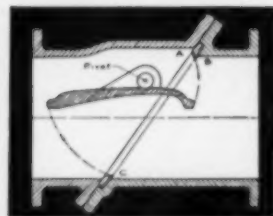
CHAPMAN Tilting Disc Check Valves

Add it all up. With Chapman Tilting Disc Check Valves you get no flutter, no vibration, no slamming or jarring or scraping of disc and seat. You get fast, sure and *quiet* operation at all times.

This is the silent treatment for valves and what it means to you is a matter of dollars and cents. You have less headaches, less trouble, less maintenance for valves and system even under severe operating conditions.

This silent treatment is an exclusive with Chapman Tilting Disc Check Valves in iron and steel . . . has been for years. These quick and quiet valves handle fluids or gases under a wide range of pressures.

You can order them for replacement or new systems. Why not, right now, check our Catalog 30-A? If you don't have a copy readily on hand, write for it today.



Here's the Inside Story

When the flow is on, "airfoil disc," supported on pivot, floats on whatever flow there is. When the flow stops, disc drops quickly, quietly and firmly on special bevel seat. You'll note that there is sufficient space around disc to cut down flow resistance.

THE CHAPMAN VALVE MANUFACTURING CO.

INDIAN ORCHARD, MASSACHUSETTS

INDUSTRY SPEAKS



Major Research Center in North Carolina

By JOHN F. LEE, North Carolina State College, Raleigh, North Carolina

THE MATURING industrial development of the South has given expression to the development of a major industrial research center in North Carolina. The research center is to be located in a 4,000-acre research park situated in the Research Triangle of North Carolina.

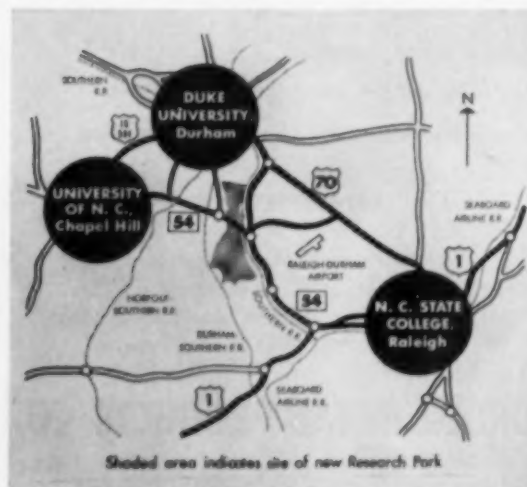
The Research Triangle consists of North Carolina State College in Raleigh, Duke University in Durham, and the University of North Carolina in Chapel Hill. These three major universities with 2,000 faculty members and 18,000 students have extensive library and laboratory facilities. The triangle, bounded by an industrial crescent extending through Greensboro, Winston-Salem, Charlotte, and Spartanburg, presents an unparalleled scientific and industrial community in a non-metropolitan area.

North Carolinians, business leaders, educators, and civic leaders have long recognized the powerful research facilities which make the Triangle a major research center for American industry. Confidence in the area was confirmed recently when Mr. Karl Robbins of New York acquired 4,000 acres in the heart of the Research Triangle as the site for a research park. Mr. Robbins plans to invest more than \$1,000,000 in the services and improvements.

The laboratory architectural firm of Voorhees, Walker, Smith & Smith of New York have been retained to convert the tract into a scientific community. The firm has designed such projects as the Bell Telephone Laboratories in Murray Hill, New Jersey and the Du Pont experimental station at Wilmington, Delaware. Mr. Robbins is the former head of Robbins Mills.

PLANS FOR RESEARCH PARK. Governor Luther H. Hodges, fourth from left, as he, Karl Robbins, retired industrialist, second from left, and others go over and approve plans for the research park within the Research Triangle of North Carolina.

Left to right, others in the above picture are: Perry Cope Smith and H. F. Gherardi of the architectural firm engaged to develop the park; Robert M. Hanes of Winston-Salem, president of the Triangle Committee; James H. Brooks, Jr., of the architectural firm; Dr. George L. Simpson, Jr., director of the Committee; Director William P. Saunders, Department of Conservation and Development; and Director William F. Bobcock of the State Highway Commission.





BORDEN MANUFACTURES EVERY TYPE FLOOR GRATING

IN FERROUS AND NON-FERROUS METALS

- **EASY TO INSTALL** — engineered in conveniently sized units for easy installation.
- **EXTRA STRONG** — reinforced, designed with maximum safety factor.
- **LIGHT WEIGHT** — approximately 80% open, reduces dead weight, allows greater live load.
- **SELF-CLEANING** — creates greater safety, economy of maintenance, no sweeping or washing required.

See our Catalog in Sweets

BORDEN METAL PRODUCTS CO.

Gentlemen:

Please send me BORDEN Catalog

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All/Weld, Pressure Locked, and Riveted Floor
Gratings in this FREE 8-page catalog

BORDEN METAL PRODUCTS CO.

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SOUTHERN PLANT—LEEDS, ALA. — MAIN PLANT—UNION, N. J.

TIMELY COMMENTS



Your Lighting Dollar

WHEN YOU build a new plant, expand, or modernize, you are making an investment in fixtures, lamps, and wiring. The lighting system and its maintenance is on a par with efficient, labor-saving machines. Your lighting is another tool for production.

Don Holick, Chief Engineer for Tube-Kote in Houston, Texas, recently decided to switch from a proposed \$7,000 lighting system to one that would cost \$7,240 for their new New Orleans processing plant. The more expensive installation not only produces better lighting but will save Tube-Kote more than 25 times the difference in installation cost in the first five years of operation. The switch was from incandescent to mercury vapor lamps in a housing designed especially for use with the color-corrected mercury vapor lamps. There was a reduction in initial wiring and electrical equipment cost and the more expensive installation will save \$873 per year on electricity and \$365 per year in lamp replacement costs.

In Marietta, Georgia, Lockheed Aircraft recently relighted their Small Tool Repair Shop grinding area. 200 watt glass enclosing globe fixtures were replaced with two 40 watt semi-direct (25% up light) and 30" shielded fluorescent fixtures. The unsatisfactory lighting level was increased to an average of 50 footcandles with only a 16% increase in power consumption. Existing wiring system was used.

In this modernization, Lockheed's Plant Engineering Department was confronted with overhead interferences (dust collector systems, air conditioning ducts, sprinklers, etc.) and the installation of continuous rows of fluorescent fixtures presented a problem. It was solved with plug-in fixtures, consisting of a uni-race channel with fixture receptacles. This aluminum channel is completely wired on the floor and is then lifted into place by men on ladders. Fixture is completely self-wired including ballast and plug. Maintenance benefits are obvious.

TO HELP PLANT ENGINEERING PERSONNEL, these and other case studies from the South & Southwest are continually reported in SPI. This from-the-plant reporting is now being supplemented with an **INDUSTRIAL LIGHTING SERIES — 13 FEATURE ARTICLES** on "Good Lighting — A Tool for Production." Exclusive SPI series is presented by Roy Palmer of the Duke Power Company. Mr. Palmer is one of the South's leading authorities on lighting applications.

In SPI for July, Mr. Palmer discussed the four fundamentals of seeing — size, brightness, contrast and time. The August issue featured recommended levels of illumination for all kinds of manufacturing and process operations. Planning fundamentals were outlined in September. Fluorescent and mercury lamps were highlighted in November and trends in incandescent lighting are summarized in this issue.

January-August, 1958 issues of SPI will feature: Paint & Lighting, Cost of Good Lighting, Good Lighting & Safety, Special Applications, Protective Lighting, Industrial Offices, and Wiring. SPI for September will present a "Check-List on How to Get the Most from Your Lighting Dollar."



First Modern Coal Fired Station in Florida*

Features of Gannon Station

TAMPA, FLORIDA is experiencing a rapid increase in electric load. In 1947 the Tampa Electric Company had one steam electric power station with a capability of 65,000 kw. Today they have three stations with a total capability of about 430,000 kw.

The latest unit to go in service is Unit No. 1 at the new Gannon Station which has a nominal rating of 120,000 kw and an expected gross capability of 135,000 kw. Unit No. 2 is under construction for operation in October, 1958 and is expected to provide an addition of 139,000 kw. Unit No. 3 is on order for operation in October, 1960 and presently is expected to provide 171,000 kw.

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and

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Corporation

On this basis, the system capability will be increased to about 724,000 kw, an increase of 1,000% in 13 years. This growth has occurred in a franchise area of about 1,700 square miles, amounting to approximately 3% of the area of the State of Florida and containing 10% of its population.

Coal as Fuel

At first it appeared that coal would not be the more economical fuel for the Gannon plant. Therefore, early in February, 1955, an oil fired boiler was ordered. In the following month, a representative of the Nashville Coal Company visited the management of Tampa Electric Company to determine the conditions under which coal could be used. Price, delivery and length of contract period were discussed.

A 20-year contract with provisions for limited price adjustment was signed. Changes in the boiler

*Abstracted from paper presented at the Fall Meeting of SOUTHEASTERN ELECTRIC EXCHANGE, September 26 in Atlanta, Ga.

design were negotiated, and the plant design proceeded on the basis of coal as the primary fuel, with provisions for possible future use of oil or gas.

Coal was to come from the West Kentucky coal fields, the primary supply being the Uniontown mine of the Nashville Coal Company, later purchased by the West Kentucky Coal Company. This mine is located near the Ohio River and the coal moves in barges down the Ohio and Mississippi rivers to a coal terminal near New Orleans, where it is transferred to ocean-going barges and towed across the Gulf of Mexico to Tampa Bay and to the unloading dock at Gannon Station.

Subsequent contractual problems have made it necessary to obtain some coal by rail from other sources, as well as from the originally planned source. Permanent full capacity rail coal unloading facilities are now being studied.

Design Criteria

The plant design seeks a balance between investment, reliability and operating costs which reflect fuel price, thermal economy, maintenance and operating labor.

The principal criteria for station design were a fixed charge rate of 15%, an incremental value of \$1,600 for each Btu in net station heat rate, an incremental value of \$100 per kw of net station capability and a corrected annual average capacity factor of 70%.

A detailed study was made to determine the effect of each part of the plant on station cost and reliability. All parts considered unnecessary were omitted. For example, all by-passes were omitted at feedwater heaters. Considerable investigation was made of existing cyclone burner fired boilers and of proposed design improvements to insure high availability of the boiler equipment.

Air preheaters, boiler, forced draft compressors, circulating water pumps, fly ash collector, hot air and gas ducts, recirculating gas fans and related apparatus were installed out-of-doors, reducing the need for building and ventilation.



No investment for future facilities, such as fuel oil storage and pumping equipment, was made where such investment could be made in the future at reasonable cost.

General Design

The accompanying photographs show the plant and site. Provision is made for yard storage of 400,000 tons of coal and space has been reserved for possible future storage of fuel oil. City water and demineralized water storage tanks are located outdoors. Circulating water obtained from the 30 ft deep ship channel is pumped across the point, through the condensers to a discharge flume designed for the ultimate station. The railroad siding enters the turbine room from the temporary end and will be progressively withdrawn as the station is extended.

An accompanying drawing shows the cross-sectional elevation of Unit No. 1. Unit No. 2 is essentially the same. A plan view is also

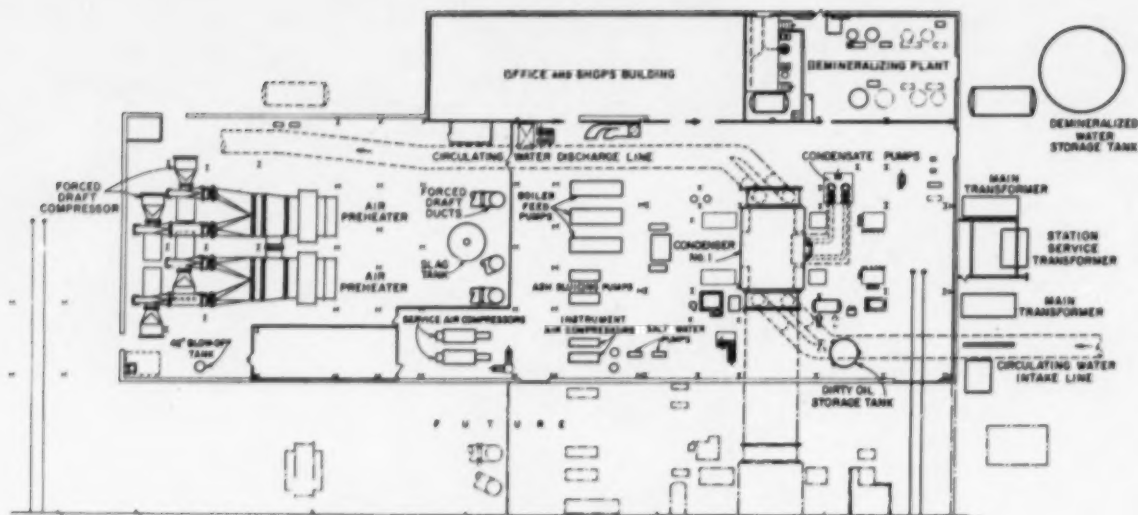
shown. Freedom is preserved for plant expansion. Step-up transformers are located to give minimum length of generator leads.

All auxiliary rotating equipment, except boiler recirculating gas fans, are on the ground floor. The forced draft system is a straight horizontal run. No deaerating heater is provided.

The coal bunker is outdoors, reducing building costs, and explosion hazards. Switchgear for station auxiliaries is located in the bay alongside the boiler and turbine, reducing length of cable leads. The stack is placed on steelwork to eliminate need for additional piling.

The service, administration and water demineralizing buildings are located on the permanent end of the station and are arranged for possible enlargement. The centralized control room and the offices are air conditioned; other areas are open.

The semi-outdoor building affords protection from short but



Ground Floor Plan of Unit No. 1

heavy rains common during certain periods of the year. Cast-in-place concrete filled pipe piles carried to rock, approximately 46 ft long, were required under all major structures, except the intake structure which was founded on rock. The coal dock is supported on precast concrete piles.

The condenser floor is at 9 ft elevation above mean low water in order to balance pumping costs against foundation costs. Because of the possibility of hurricane tides, flood protection was provided for the power house to 17 ft above

mean low water by means of concrete walls and steel bulkheads.

Boiler Equipment

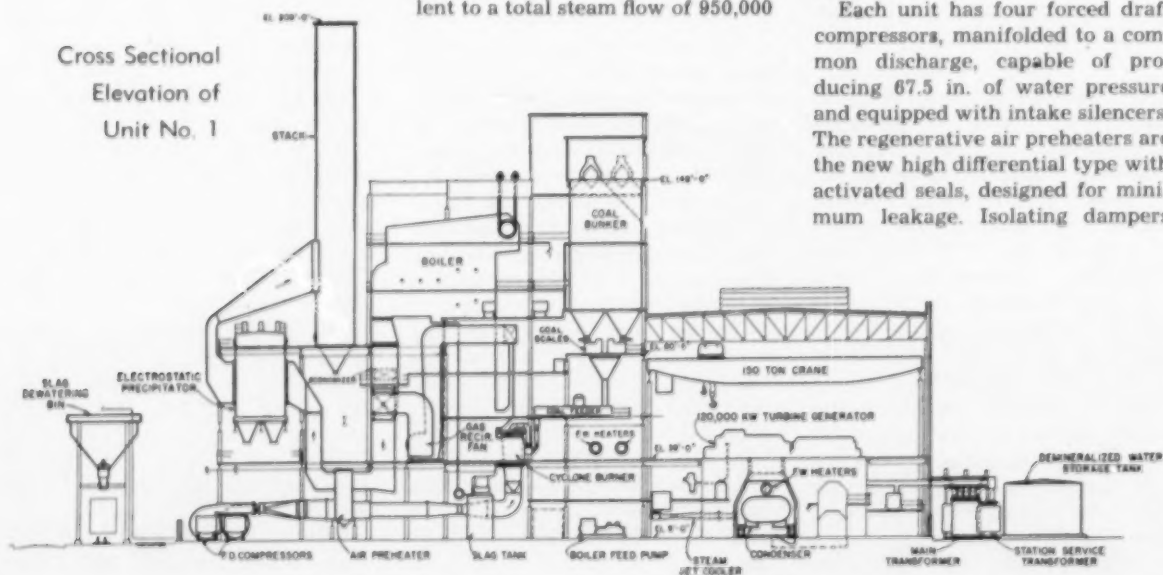
The steam generators for Unit No. 1 and Unit No. 2 are identical, each having a pressurized furnace and three cyclone burners arranged in a single row. The burners are the Vortex-type with coal feed entering at the center of the burners from three drag-link coal feeders. No rotary seal valves are installed.

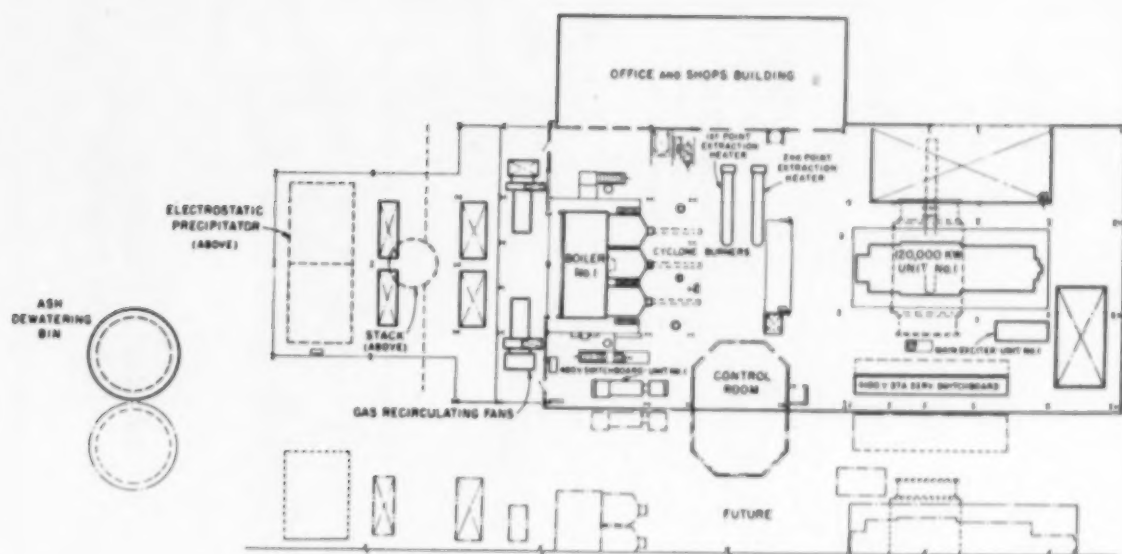
The furnace heat release is 85,800 Btu per sq ft per hr. The boilers are designed for an output of $1,107.7 \times 10^6$ Btu per hr, equivalent to a total steam flow of 950,000

lb per hr from the superheater outlet at 1,580 psi gage and 1,000 F and a flow of 839,000 lb per hr from the reheater outlet at 470 psi gage and 1,000 F.

It is expected the limiting factor in boiler performance will be tube metal temperatures. Thermocouples have been installed to provide actual tube metal temperatures in the vestibule at the outlet of the secondary superheater and reheater sections. Constant steam temperature is maintained by a combination of flue gas circulation and spray attenuation down to a steam generation of about 550,000 lb per hr.

Each unit has four forced draft compressors, manifolded to a common discharge, capable of producing 67.5 in. of water pressure and equipped with intake silencers. The regenerative air preheaters are the new high differential type with activated seals, designed for minimum leakage. Isolating dampers





Operating Floor Plan of Unit No. 1

are provided on the hot flue gas and hot air side to maintain high boiler availability.

Since Tampa is a clean area, with many light colored buildings, the requirement was made that the burning of coal should not result in the discharge of more ash to the atmosphere than would occur with oil firing. This has been accomplished by installation of electrostatic precipitators with continuous rapping. Fly ash may be reinjected into the cyclone burners.

Turbine Generator

Unit No. 1 has a nominal rating of 120,000 kw. Steam conditions are 1,450 psi gage, 1,000 F at the throttle and 1,000 F reheat. The conventionally cooled generator has a rating of 147,059 kva at 30 psig hydrogen. The main exciter is separately driven and a spare exciter set is provided. The turbine is provided with a steam by-pass around its high pressure section. Anticipated gross generating capability of this unit at 1,525 psig is 135,000 kw with 1.5 in. Hg back pressure.

Unit No. 2 has the same nominal rating and the same size generator. It will not be provided with a steam by-pass but is expected to develop 139,000 kw under the same conditions.

The accompanying heat balance is for Unit No. 1 at 135,000 kw with

five heaters. Study indicated a sixth heater could not be justified due to increase in turbine price.

Because of the warm circulating water, the oil and hydrogen coolers will be cooled by condensate circulating in a closed system with a steam jet refrigeration unit giving up heat to the main condenser. The refrigeration unit will also cool the bearing cooling water for station auxiliaries which is recirculated to avoid use of highly corrosive sea water. The calculated economy for Unit No. 1 is 9,755 Btu per kwh for a net output of 124,080 kw corresponding to a gross generation of 131,080 kw and a boiler efficiency of 88.6 per cent.

Auxiliary power requirements at 120,000 kw gross generation amount to continuous use of about 6,475 kw and intermittent use averaging 325 kw primarily for coal crushing and conveying. The total of 6,800 kw represents about 5.7% of rated capacity.

Since no deaerating heater is installed, special provisions have been made in the 75,000 sq ft single pass, surface condenser to obtain good deaeration at light loads. Vertical pit type condensate pumps supply water at about 250 psi direct to the suction of the boiler feed pumps.

Water Treatment Equipment

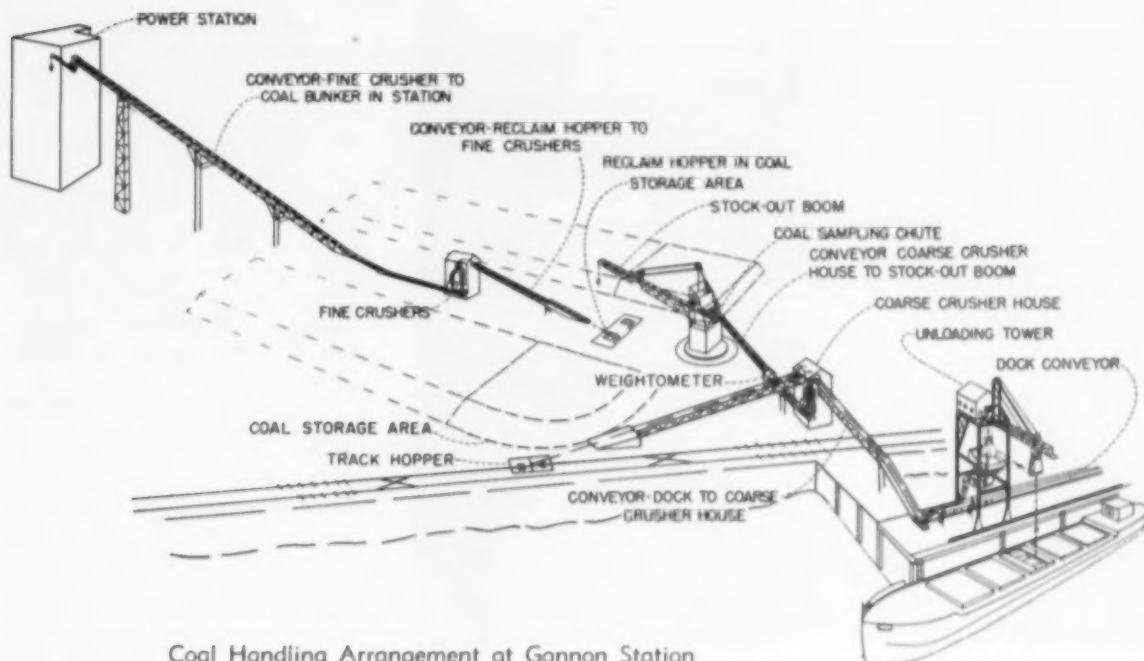
Demineralization was selected

Construction Cost of Gannon No. 1 Unit
at January, 1957 Price Levels

	Dollars	Dollars Per kw*
Structures	930,000	6.90
Boiler Plant Equipment	7,050,000	52.20
Turbine Generator Unit	5,020,000	37.20
Accessory Electric Equipment	1,190,000	8.90
Miscellaneous Plant Equipment	110,000	0.80
Total Generating Facilities	14,300,000	106.00
Substation	815,000	6.00
Total Plant	15,115,000	112.00

*Gross Capability of 125,000 kw





Coal Handling Arrangement at Gannon Station

because cost was comparable with evaporation, and this method of producing high quality make-up is independent of the turbine cycle.

Two-bed demineralizing equipment, including the cation and anion exchangers, acid and caustic storage and regeneration facilities were installed with a capacity of 57,600 gal between regenerations. Design flow rate is 48 gpm. Maximum flow rate is 88 gpm. The demineralizer is guaranteed to produce an effluent having an average total dissolved solids content of no more than 1 ppm and silica content from 0 to 0.1 maximum.

Demineralized water is delivered directly to the condenser at a selected flow rate for removal of dissolved oxygen. Excess above the boiler make-up requirements is stored in a 90,000 gal demineralized water storage tank.

Centralized Control

A single centralized control room for Units 1 and 2 includes controls for both boilers, both turbine generators, their condensers, electrical circuits and auxiliaries. No separate electrical control boards are provided elsewhere in the station. An open relay area

is provided below the centralized control room.

The benchboard and vertical board were developed from full size models. Cyclone burners and turbine generators may be observed from the control room.

Operation of the two-unit station will require five men per shift in the station, and four operators on one shift in the yard for coal handling. Supervisory and general service personnel, including watchmen, will probably total 12 men. The total operating force will probably be 43 men. Major maintenance will be done by a group serving all of Tampa electric stations.

Coal and Ash Handling

The coal handling system is divided into two distinct sections (see drawing), the first to meet the requirements of coal receipts and yard storage and the second to meet the needs of the station itself.

Coal received by ship or barge is unloaded by a traveling clam-shell bucket unloading tower, feeding a belt conveyor transport system. After coarse crushing, weighing, and sampling, the coal is distributed either directly over

two reclaim hoppers at ground level or on top of the 30 ft high permanent storage pile by a rotating boom type conveyor.

Coal discharged over the reclaim hoppers will be available for immediate transfer to the station while coal discharged on top of the permanent pile will be distributed by bulldozers requiring a minimum of uphill movement.

Storage space under the limits of travel of the boom conveyor is provided to permit the complete unloading of the largest expected ship or barge at any time without requiring operation of either mobile yard or the reclaim conveying equipment.

The conveying system transporting coal from the unloading tower to the storage area is equipped with two-speed drive machinery, permitting handling of 500 tons per hr initially and ultimately 1,000 tons per hr if a second unloading tower is installed.

Coal received by rail will be unloaded in a single two compartment track hopper with the assistance of a vibrating car shaker at the rate of 500 tons per hr. From the track hopper, coal will be transported by belt conveyor to



Central Control Room
of Unit No. 1

the coarse crusher house where it will be transferred to the ship unloading conveying system.

The weighing, sampling and coarse crushing facilities will serve both water and rail coal receipts. Future installation of a second, duplicate, track hopper will provide a maximum rail unloading rate of 1,000 tons per hr.

Coal for the station is reclaimed from yard storage through the two reclaim hoppers located below the discharge of the boom conveyor. Approximately 5,000 tons of the coal distributed over the reclaim hoppers by the boom conveyor will be reclaimable by gravity without the assistance of mobile equipment. Bulldozers will be used

PRINCIPAL EQUIPMENT — Unit No. 1, Gannon Station

STEAM-PRODUCTION EQUIPMENT

- Steam Generator** One—The Babcock & Wilcox Company, 953,000 lb per hr, pressurized reheat, 1,700 psi gage drum, 1,580 psi gage superheater outlet at 1,000 F. Coal fired, outdoor unit with three cyclone burners. Automatic ignition pilot torches. Heating surfaces: boiler, 2,322; water walls, 14,975; superheater, 54,311; reheater, 16,214; economizer, 9,979 sq ft. Furnace heat release at rated capacity 24,900 Btu per cu ft per hr. Superheat control, spray and gas recirculation type. Casing designed for pressure operation.
- Soot Blowing Equipment** Copen-Vulcan Division, automatic sequential, electric motor driven steam soot blowers
- Air Heater** Two — Air Preheater Corp., Ljungstrom, size 22½ H54, high differential type
- Forced Draft Compressor** Four—American Blower Corp., 78,200 cfm at 67.5 in. water; 1,800 rpm, motor driven; inlet vane control

POWER-GENERATING EQUIPMENT

- Turbine-generator** One—General Electric Co. Turbine: 120,000 kw name plate rating, 3,600 rpm, 1,450 psi gage, 1,000/1,000 F. 21 stages, 5 extraction points, exhaust 1½ in. Hg, water and steam shaft sealing, indoor casing. Generator: 147,059 kva at 30 psi gage H₂ and .85 pf, 15,500 v; 4 conventional coolers. Separate exciter 375 v, 400 kw, 1,200 rpm, air cooled
- Condenser Equipment** Westinghouse Electric Corp. Condenser: 1—single pass, vertically divided type, 75,000 sq ft, 660,000 lb per hr design capacity, circulating water temp 80 F, deaerating hot well. Hot well pumps: 2—vertical, 6 stage, 1,650 gpm, 235 psig head, 79.5% efficiency, motor driven. Steam jet ejector, 1—two-stage element on common inter and after condensers. Hogging jet, 1—single stage, noncondensing. Circulating water pumps, 2—vertical axial flow, 52,500 gpm capacity, 16 ft head, 350 hp motor drives, 500 rpm

FEED WATER EQUIPMENT

- Feed Water Heaters** Five — Westinghouse Electric Corp. High pressure units: 1st and 2nd points, horizontal U-tube, 1,800 psi gage, 922,000 lb per hr, 2-pass. Low pressure units: 3rd point, vertical U-tube, 340 psi gage, 740,000 lb per hr, 4-pass; 4th point, horizontal U-tube, 300 psi gage, 740,000 lb per hr, 2-pass; 5th point, horizontal U-tube, 300 psi gage, 740,000 lb per hr, 4-pass. 4th and 5th point heaters combined in single shell
- Boiler Feed Pumps** Three — Ingersoll-Rand Company, 500,000 lb per hr, 10 stage, horizontal 4,300 ft differential head, 77% efficiency, 3,600 rpm, 1,500 hp motor. Water temperature 318 F
- Heater Drip Pump** Two—Ingersoll-Rand Company, 470 gpm, 6 stage, vertical, 120 psi gage differential head, 68% efficiency, 1,750 rpm, 100 hp motor

COAL AND SLAG HANDLING EQUIPMENT

- Conveying Equipment** Continental Gin Company
- Conveyor Belting** Hewlett-Robins, Inc.
- Coal Crushers** Pennsylvania Crusher Division. 1—coarse crusher, reversible impactor type, 1,000 TPH, 900 rpm, 400 hp motor. 2—fine crushers, reversible Hammermill type, 250 TPH, 900 rpm, 500 hp motor
- Slag and Ash Handling Equipment** United Conveyor Corp. Furnace bottom slag handling and fly ash reinjection equipment
- Fly Ash Collector** Research-Cottrell, Inc.
- Coal Scales** Six—Stock Equipment Co.
- Coal Feeders** Three—The Babcock & Wilcox Co.

AUXILIARY EQUIPMENT

- Turbine Room Crane** One — Harnischfeger Corp. 150 ton capacity

to reclaim the remaining portion.

Thirty-six in. belt conveyors transport coal from the reclaim hoppers to the fine crushers for reduction to the required size necessary for cyclone burner firing and thence to the station bunkers. Initially a single conveyor system and two fine crushers are provided to handle 500 tons per hr but provisions have been made for duplicate equipment. No coal will be crushed within the power station.

Slag from the hopper under the cyclone furnace is pumped to a dewatering bin and discharged to railroad cars or trucks. Contrary to usual circumstances, the slag can be sold as discharged from the bin. Dry fly ash from the

electrostatic precipitator can also be sold, and facilities are being provided for temporary storage in suitable containers for customers.

Electrical Equipment

The generator is rated 15.5 kv, and leads to transformers are isolated phase bus. Two 75,000 kva, forced-oil-air cooled three phase transformers are connected in parallel on both sides. High side voltage is 138 kv.

Station service is normally provided by a 10,000 kva transformer connected to generator leads. A 12,000 kva transformer fed from a 69 kv line provides reserve power for startup or emergency operation. Motors rated 350 hp

and larger are 4,160 v, smaller motors are 440 v. Outdoor motors are weather-protected or totally enclosed.

Cable for 4,160 v service is butyl rubber insulated with aluminum interlocking armor. For 600 v power, butyl insulation is used, and multiconductor control cable is polyethylene and nylon insulation on individual conductors and polyvinyl chloride external jacket overall. Cable trays are used indoors and outdoors to minimize cost and provide ease of installation and inspection.

Automatic synchronizing is provided for all main oil circuit breakers. All breakers and line disconnects are operable from the
(Continued on page 94)

Traveling Water Screens	Two—Link Belt Company
Service and Instrument Air Compressors	Two each—Penn. Pump & Compressor Co.
Turbine Oil Conditioner	Bowser, Inc.
Chemical Feed Pumps	Hills-McCanna Co.
Miscellaneous Tanks	J. C. Mahoney, Inc., and Plant City Welding & Tank Co.
Salt Water and Slag Sluice Pumps	Two each—Allis-Chalmers Mfg. Co.
Miscellaneous Pumps	Goulds Pumps, Inc., Worthington Corp., and The Weiman Pump & Mfg. Co.
Steam Jet Refrigeration Equipment	One—Ingersoll-Rand Company
Water Treating Equipment	Hungerford & Terry, Inc.
City Water Storage Tank and Demineralized Water Tank	Chicago Bridge & Iron Company
Steam Air Heaters	American Blower Corp.
Chlorination Equipment	Wallace & Tiernan, Inc.

PIPING AND VALVES

High and Low Pressure Piping	National Valve & Mfg. Co.
Circulating Water Piping	Lock Joint Pipe Co. and Bushnell Steel Works, Inc.
Valves	Walworth Co., Crane Co., The Chapman Mfg. Co., Manning, Maxwell & Moore, Inc., Fisher Governor Co., Edward Valves, Inc., W. S. Rockwell Co., Conoflow Corp., Farris Engineering Corp., and Keystone Valve Corp.
Level Alarms	Magnetrol, Inc.
Pressure and Temperature Switches	The Merco Company
Expansion Joints	Goodall Rubber Co., and United States Rubber Co.
Water Strainers	Elliott Company

INSTRUMENT AND CONTROLS

Combustion Control	Bailey Meter Co. Three element
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feed water control, feed pump recirculation control, condensate control, meters and draft gages

Heater Level Controls	Fisher Governor Company
Temperature and Conductivity Recorders	Leeds & Northrup Company
O ₂ Recorder	Cambridge Instrument Co.
Drum Level Indicators	Yarnall-Waring Co.
Pressure Gages	Manning, Maxwell & Moore, Inc., and United States Gage Div.
Thermometers	Palmer Thermometers, Inc.
Instrument Air Dryer	Industrol Corp.

ELECTRICAL EQUIPMENT

Spare Exciter Set	General Electric Company
Generator Field and Voltage Regulating Switchgear	General Electric Co.
Main Transformers	Two — General Electric Co., 75 mva
Station Service Transformers	General Electric Co., 4160 v
Lighting Unit Substation	General Electric Company
Controls Panels	General Electric Co.
Motors and Controls	General Electric Co., 4160 and 440 v
Breakers & Disconnects	General Electric Co.
Carrier Current Equipment	General Electric Co.
Supervisory Control Equipment	Control Corp.
Boiler and Turbine Gage Boards	G & N Engineering Co. and Tampa Armature Works, Inc.
Emergency Lighting Generator	D. W. Onan & Sons, Inc.
5 kv Cable	Simplex Wire & Cable Co.
600 v Butyl Insulated Cable	General Cable Corp., control cable, multiconductor cable
Control Storage Batteries	Goulds National Batteries, Inc.
121 kv Lighting Arrestors	Westinghouse Electric Corp.
Public Address System	Gai-tronics Corp.
Telephone System	Automatic Electric Sales Corp.

Houston, Texas . . .

Towline Trailer System



ABOVE — Traffic congestion in the narrow aisles is eliminated by these two and three car trains of towline trailers.

BELOW—As towline approaches lift bridge over the tracks, its path swings out to enable trailers to negotiate the right-angle turn.

BELOW, RIGHT—Hitching staff of lead trailer is being removed from one of the hooks on the towline chain.

WITH ITS daily volume of freight handling constantly increasing, and limited by its relatively narrow freight platforms, a problem of platform congestion was in the making at the Houston freight station of the Texas and New Orleans Railroad, division of the Southern Pacific.

The installation of a towline trailer system, for channeling freight along orderly paths at a uniform speed, has minimized conflicting movements of traffic on the platforms and increased substantially this freight station's handling capacity.

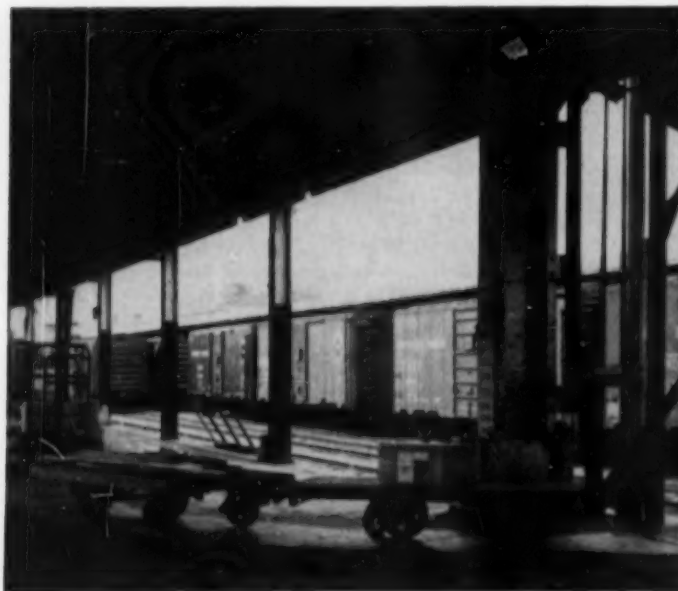
Essential elements of this Mercury Manufacturing Company towline system include (a) a powered link-chain towline that makes a 2,030 ft circuit through this freight station and (b) a fleet of 375 industrial trailers which, when towed by this moving chain, convey 700 tons of freight daily. The path of the towline around this 1,100 ft long U-shaped double freight dock is completed by the use of a lift bridge at the open east end of the

U. The north arm of the U handles outbound freight, while the south arm handles inbound freight.

Four tracks admit freight cars for loading and unloading. The inbound platform has a capacity of 80 cars. The outbound platform has a capacity of 90 cars. The overhead link-chain conveyor travels near the inner edges of the platforms, giving easy access to the open doors of the cars.

The burden carriers of this system, two- and three-unit trains of Mercury A-310 caster-wheel trailers, are hitched to and unhitched from the moving chain by special spring-loaded hitching staffs having coupling loops at their upper ends. Only the lead trailers are equipped with the hitching staffs. Lead trailers usually pull two standard Model A-310 trailers. Hitching staffs are hooked on to one of 135 hooks spaced 15 ft apart along the length of the 2,030 ft long link-chain.

All trailers are equipped with Mercury's Safety-Self Coupler. The towline chain is powered by



a single 15 hp electric motor. A complete circuit is made by the traveling chain in 19 min. Because of this slow, constant speed, trailers are easily hitched or unhitched without stopping the chain.

The lift bridge, over which the trailers travel, raises to a height of 22 ft to permit passage of incoming and outgoing freight cars as they are emptied or filled. This bridge, a product of the Texas and New Orleans shops, is powered by

a 5 hp motor that lifts it to its full height in 10 min. The chain towline runs across this bridge on a 4-in. H-beam track. Because the chain can be disconnected at any link, the lift bridge can be opened at any point in the chain tow system.

The system can be started or stopped from any of 13 control stations located around the course of the towline. Controls are located on columns.

In the warehouse section of the north (outbound) freight dock, where the towline system does not extend, trains of the A-310 trailers are hauled by a fleet of "Banty" gasoline tractors, also produced by The Mercury Manufacturing Company. These adjuncts to the overall handling system permit trailer trains of freight to be hauled quickly into and out of warehouse areas and to and from any other point in the station.



New Orleans, Louisiana . . .

Shock-Proof Handling

SINCE the New Orleans plant of American Standard was opened in 1949, Bassick Company "Floating-Hub" casters have been used.

The problem is to move heavy, but fragile, plumbing fixtures just after they have been cast, before firing, when a jar could ruin them. One of the most delicate operations is to move the pieces into a dryer and thence to inspectors. The trucks must be shock-proof. Rubber tired casters would be too hard for a man to push due to the heavy load.

But Bassick 10-in. steel wheel "Floating-Hubs" (see photo) are sufficiently jar-proof, stable and shock-absorbing to protect the fragile material and yet allow one man to move the heavy loads with ease.

The casters have a shock absorption mechanism built into the hub of the wheel. By means of an eccentric, the wheel center is offset from the axle center and a spiral spring absorbs the shocks and supports the load. Such a balanced wheel, rolling on a true center with the load carried off center, allows the wheel to ride over bumps without lifting the load.

The Bassick casters which absorb the shocks of bumps and rough floors protects the material carried, along with providing floor protection and greatly reducing noise.

Tight Valving Critical



Operator uses grease gun to lubricate valve through buttonhead fitting. Periodic lubrication reinforces valve seal and promotes long service.

PIPING and valving specifications for carbon bisulfide manufacturing are particularly rigid. CS_2 is highly volatile, flammable when mixed with air, toxic, and a solvent.

At Stauffer Chemical Company's Roanoke, Va., carbon bisulfide manufacturing plant, pumps used on lines containing CS_2 are specially designed to preclude the possibility of leakage. Piping is of high-grade steel, and lubricated plug valves insure leak-free operation.

Specification of lubricated plug valves on all CS_2 lines was based on the tight shut-off afforded by the valve's tapered steel plug and pressurized lubricant seal, as well as on the favorable maintenance characteristics of this type of valve. In all, over 150 Rockwell-Nordstrom valves, 1- to 6-in. in size, are incorporated in the piping system.

At the Roanoke plant, one of the world's largest, production is by the continuous process, around the clock each day in the week.

In the process, solid sulfur is steam-melted and pumped to a bank of gas-fired reactors. Steam-jacketed lubricated plug valves on the molten sulfur lines prevent the sulfur from cooling and forming a solid which would block flow. Molten sulfur continuously enters the reactors and charcoals and other carbons are introduced through the top of the vessels. CS_2 vapor with some non-condensables, is carried off at high temperature.

Progressively colder condensations remove as much CS_2 as possible from the steam. Condensed CS_2 flows to crude storage after each operation. Final step utilizes oil absorption. Absorbed carbon bisulfide is stripped from an oil stream with steam, recovered and piped to storage. Remaining non-condensables are scrubbed with caustic soda to produce sodium hydrogen sulfide.

From crude storage, the CS_2 enters crude stills, where it is distilled, then condensed and piped by gravity to underground storage to await shipment.

Valving at still bottoms is particularly critical, since in addition to tight closure, valves must have enough physical strength to handle drawn-off sulfur slurry.

No Pumping—Carbon bisulfide's heavier-than-water specific gravity of 1.27 permits an interesting method of piping CS_2 from underground storage to tank trucks without the use of pumps. Finished CS_2 is stored in water-filled steel tanks; the tanks are contained in water-



This manifold of lubricated plug valves controls flow of CS_2 and water to and from storage in steel tanks located beneath the water level. In normal operation, valves are often covered to the shoulder with water and are operated by specially - designed long - handled wrenches.

filled concrete pits. In normal tank-filling operation, CS_2 is introduced into the bottom of the tank and, with its heavier specific gravity, displaces the water in the tank. However, when tank car filling is desired, water under pressure can be pumped into the tanks, displacing the CS_2 and forcing it from the tank into the railroad car. This

avoids the use of a pump on the CS_2 line and the resultant possibility of leakage.

From a maintenance standpoint, the lubricated plug valves used on underground storage are probably subjected to the hardest treatment of any in the system. They are immersed in water and carry an internal stream of CS_2 ; these valves

have been used until, in some cases, the heads have become stripped with constant turning, but none has had to be replaced.

Stauffer engineers report that a program of periodic lubrication performed by grease gun while the valves are in service, is all that has been necessary to maintain them in good condition.

Technique Eliminates Need for Backing Rings or Inserts

Welding Pressure Piping

AN ARC-WELDING process which eliminates the need of metallic backing rings or inserts when welding butt joints in pressure piping systems is being successfully applied by Stone & Webster Engineering Corporation.

In power, chemical, petroleum, nuclear installations and in other applications where it is necessary to produce a uniform inside bead condition, this inert-gas-shielded welding procedure is used on con-

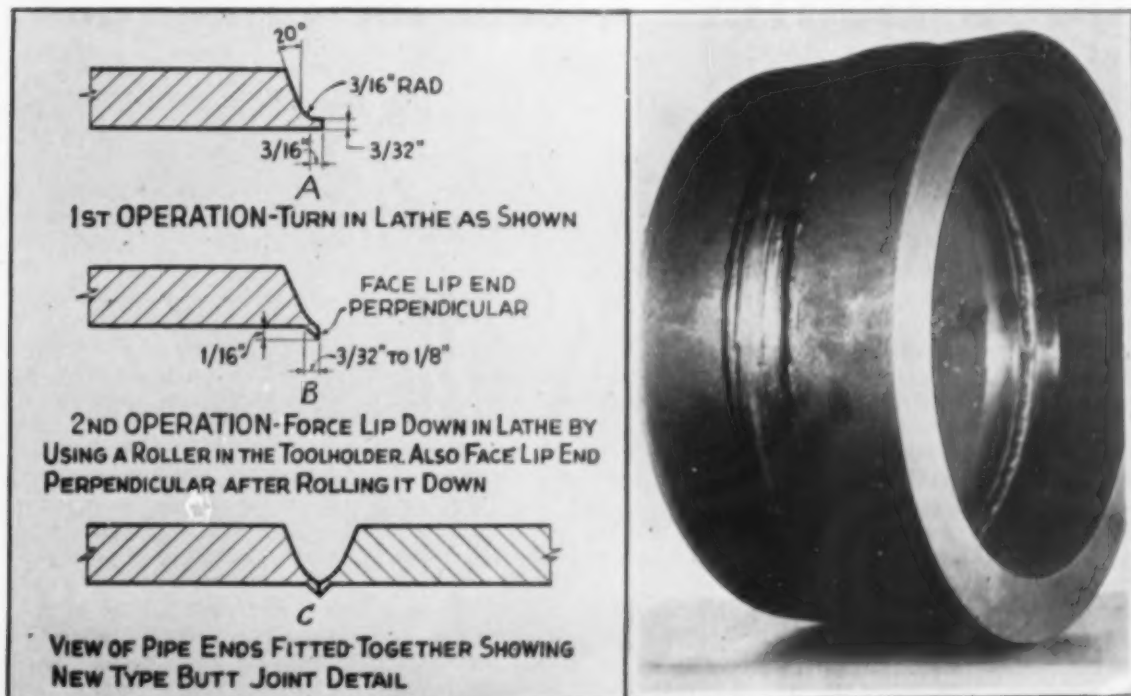
struction jobs everywhere.

Major feature of the technique, developed by R. T. Pursell, Stone & Webster metallurgical engineer, is the novel manner of preparing the root edges of the joint. Root edges are bent to produce an internal circumferential lip. When edges of this type are fused together in an inert gas atmosphere, the concave condition of fixed position yield welds is eliminated.

Another innovation of the proc-

ess is the method of burning up the paper dams with an oxy-acetylene flame or stress relieving coils. Experience to date indicates that the costs will be lower and quality superior to other techniques.

The illustrations show the manner of preparing root edges of the pipe joint for this welding procedure, and the finished weld with smooth submerged arc welding beads and the uniform condition of the inside.





This industrial plant is illuminated by 750 watt R-52 reflector lamps. A saving of \$10,000 annually in cleaning costs is reported by using these lamps.

GOOD LIGHTING a Tool for Production

PART 5 ————— Incandescent Lamps

EDISON produced the first practical incandescent lamp less than 80 years ago. But due to that lamp, we have built a tremendous industrial economy with the highest standard of living ever known. The incandescent lamp actually gave birth to the electrical industry for it began the use of electricity which today is so vital to every activity of modern life. Because of its enormous impact on civilization it indeed was one of the greatest inventions of all time.

Some thought that the development of the fluorescent lamp would make the incandescent lamp obsolete. On the contrary, the incandescent lamp is still increasing in

By ROY A. PALMER
Duke Power Company
Charlotte, North Carolina

numbers sold and importance. Actually, the fluorescent lamp added another tool to broaden the field of lighting practice. A few years ago it was assumed that further development in the efficiency of the incandescent lamp was impossible but improvements in light output have continued at a lively pace.

The word "incandescence" is defined by Webster as "glowing due to heat." From this characteristic the incandescent lamp derives its

name. A tungsten filament is heated to incandescence in a vacuum or in inert gases. Its temperature is much higher than we ordinarily encounter in other industrial applications.

If an iron rod is heated to white hot incandescence, one can see a sputtering off of iron particles. When the rod is cooled, pock marks indicate how the iron was "burned up." If the heating of the rod had been continued, it would have been entirely consumed. Similarly, as a lamp filament burns minute particles are "evaporated" from the filament and when it becomes thin enough to break in one spot, we say it has "burned out."

Lamp Life

In the days before it was possible to draw tungsten into a wire, the filament was formed with tungsten powder held together with a binder and formed into a filament. It was obviously extremely fragile and was sometimes destroyed by a slight jar. Continued improvements, however, have greatly reduced this hazard.

The fact that incandescent lamps have a definite life limit has perhaps created the impression that the length of life of a lamp is a criterion of its quality. But that is not true.

No other material has been found that is better for a lamp filament than tungsten. Years of research and practical experience have produced filaments so precisely as to length, diameter, composition, coiling, etc., that life can be most accurately controlled. While a few may burn out prematurely, close to 80% of the lamps will still be burning at 80% predicted life. Yet, only one fifth of them will continue to burn after 120% of rated life.

It should be remembered that life of lamps is based on the average of a number of lamps, not on an individual lamp. In this respect lamps can be compared to people. Life insurance companies do not base their premium rates on an individual but on the average longevity of a large number of people. They cannot point a finger at one person and say that he will live only one more year. But they can tell with uncanny accuracy how many people among 1,000 will be dead at the end of a year.

Some lamps are designed to provide a large quantity of light for short periods of time, as with the photo flood lamp. Its life is rated at 2 to 4 hours on the average, during which time many pictures can be taken. We can afford to sacrifice life of the lamp for the large volume of light it gives for short time required to take a picture.

On the other hand, lamps are made which last an average of 4,000 to 6,000 hours. These are heat lamps used in industry for drying

jobs. Their efficiency as producers of light is very low, but in this case only heat is desired. Between these short and long-life lamps are projection lamps whose life on the average is 50 to 200 hours. Here again, there is a need for a large volume of light for a relatively short time. Standard lamps used in homes, stores, offices and industry are rated at 750 and 1,000 hours average life. These like all other incandescent lamps, are designed to have an average life based on the lowest cost of light for the application for which it is intended.

Thus the photo flood lamp provides a large volume of light for a short period. The heat lamp provides less light per watt consumed, but more heat, for a long period.

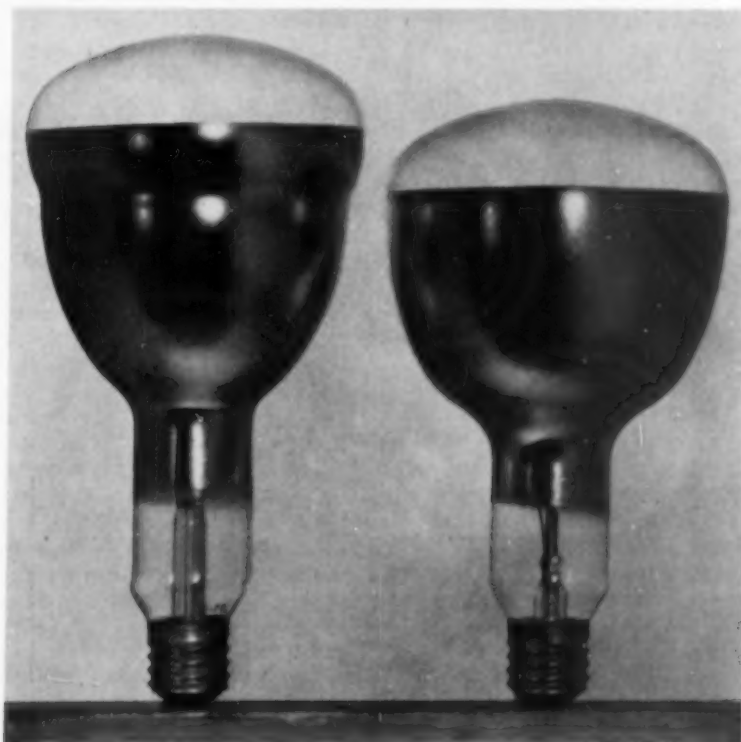
It should always be remembered that life is no longer a criteria of quality of a lamp. If a claim is made that a certain incandescent lamp "will last for 2,500 hours," you can be pretty sure that a considerable sacrifice is being made in its light output.

The best lamp for the job is based on (1) lamp efficiency, (2) the relative cost of electricity to operate it, and (3) the cost of lamp replacements. We must always keep in mind that we are buying light, not lamps alone. It may be more economical to burn out a lamp earlier than to have it last a long time, decreasing in light output as it burns.

Lamps are designed for specific voltages. When the circuit voltage in the plant falls below the rated voltage of the lamp, the efficiency drops off, less light is produced. While the life of the lamp is increased by low voltage, the cost of light is consequently increased.

As a filament lamp is burned, the particles of tungsten evaporated from the filament are deposited on the inside of the bulb. The gas in the bulb carries the particles upward and the top portion of the bulb becomes blackened. Continued burning will eventually cause darkening of the entire bulb. The light output decreases and the lamp even though not burned out, should be replaced.

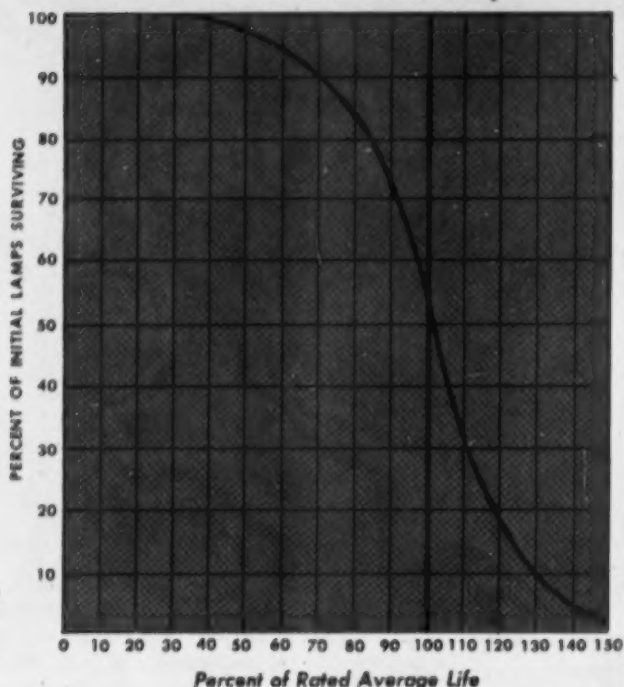
Left — The R-52 reflector lamp, available in 500 and 750 watt sizes. Right — the RB-52, 1000 watt reflector lamp.



(Continued on next page)

Incandescent Lighting Trends (Continued)

**Typical Mortality or Life Expectancy
Curve for Incandescent Lamps**



Standard incandescent lamps used for general lighting are quite rugged and can stand reasonable vibration and shock. However, where vibration is of continuous high frequency, the fixtures should be suspended by shock absorption equipment which is available for this purpose. This condition is found in older factory buildings where machines are so located that vibration is readily transmitted to the fixtures and lamps.

Special Lamps

With modern, high levels of general illumination, lamps located directly on machines are not usually required. A vibration service lamp is available where it is necessary to be attached to machines or vibrating surfaces. The filament of this lamp is held by several supports. However, these supports conduct heat away from the lamp, reducing its efficiency

compared to a standard lamp of the same wattage.

Another lamp, having specially wound filament mounted on several supports, is a rough-service lamp designed to withstand shocks or bumps. It is largely used for hand lamps but is applicable to any location where jars or intermittent shocks occur. It, too, is less efficient due to multiple support of the filament.

A lamp with a silvered bowl is available in all standard wattages. This lamp should be burned base up. The silvering directs the light upward making it particularly effective for indirect lighting in offices and laboratories.

The silvered bowl lamps were the forerunners of the reflector and projector lamps used for high-lighting small areas or for flood-lighting yards, parking lots, signs, etc.

The reflector lamp is made of

"soft" glass which is to be used only indoors, since rain or drops of vapor will break the bulb when it is hot. It is available in 30, 75, 150, 300 and 500 watt sizes. The smaller sizes 30 and 75 watt may find application in lighting small areas, at relatively close range to a high level of illumination. Larger sizes can be placed at a distance to be out-of-the-way from a machine to flood a critical work area. It has application in floodlighting indoor signs, walkways and a multitude of other uses where "highlighting" can be used to advantage.

The projector lamps are made of hard, heat-resistant glass which will withstand thermal shocks such as rain on the bulb when hot. The construction of this lamp allows greater precision in shaping the contour of the reflector and also in the positioning of the filament. Thus greater efficiency is obtained and better definition of the beam pattern. These lamps can be used outdoors for floodlighting walkways, signs, flags, parking areas, etc.

Both reflector and projector lamps are available in flood and spot beam pattern. Thus where it is desired to confine the light to a definite or limited area for special emphasis or concentration, a spot type beam will be used. Where more general distribution is desired the flood type beam should be specified.

A reflector lamp which has found considerable popularity in industrial plants is the one designated as "R-52". It is available in 500, 750 and 1,000 watt sizes — the 1,000 watt size is designated as "RB-52." The neck is silvered thus providing a reflector which cannot deteriorate because of dust and dirt as would a supplementary reflector. For this reason, it is admirably adapted for use in foundries or similar areas having considerable smoke or dust. While this lamp has its own reflector and can be used alone in an exposed socket, it is recommended that it be provided with a supplemental metal reflector to protect it from mechanical breakage.

The next installment will tell how painting and lighting can work together for better production.

NOW...IN STOCK...NOT SPECIALS

MIDWEST REDUCING ELBOWS UP TO 30"



Your demand for Midwest Reducing Elbows has dictated our decision to make them STOCK items in all pipe sizes to 30" OD and all reductions to one-half the nominal pipe size. We now have a modest stock of practically all sizes in standard and extra heavy weight, and this stock is being added to as rapidly as possible.

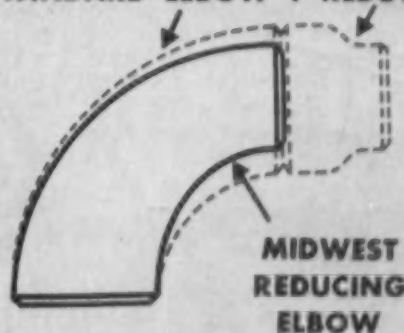
Midwest Reducing Elbows are also made as "specials" in heavy wall and/or any weldable alloy. The fact that our raw material is plate instead of tubing greatly increases our range of wall thicknesses and types of materials . . . it also improves the delivery.

Note the significant advantages of Midwest Reducing Elbows listed below. For further information, get in touch with the nearest Midwest Distributor or write us for Catalog 54.

✓ CHECK THESE ADVANTAGES OF MIDWEST REDUCING ELBOWS

- ✓ Save more than 1/3 of the welding required by standard elbows and reducers.
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- ✓ Fit into smaller space than straight elbows and reducers.
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- ✓ Improve appearance of piping.
- ✓ Available from stock in sizes to 30" OD. (Heavy walls and alloys on special order.)

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MIDWEST PIPING COMPANY, INC.

Main Office: St. Louis 3, Missouri (P. O. Box 433)

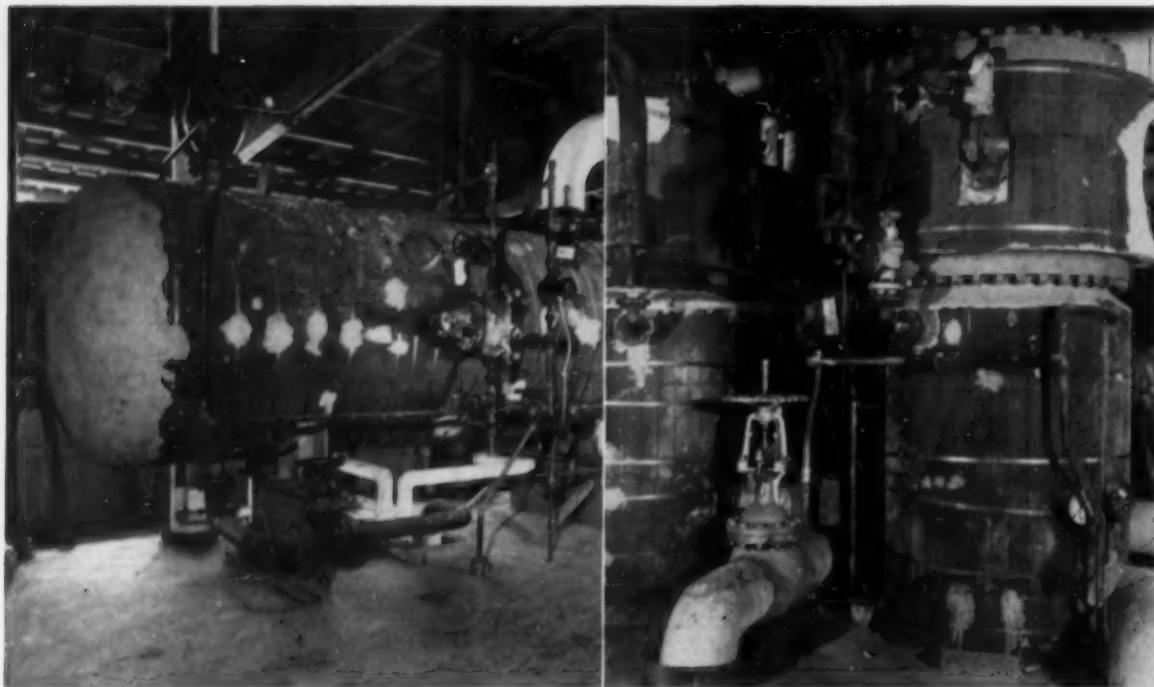
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STOCKING DISTRIBUTORS IN PRINCIPAL CITIES



One 2-inch layer of insulation on evaporator

Two 2-inch layers cover stage heaters

How Kansas City Power & Light Co. Covers Hot Surfaces

Long Lasting Insulation

ENGINEERS know the value of good thermal insulation and how it helps maintain the heat balance of an electrical generating station. Once the fuel gives up its heat to the boiler water, this heat must be conserved in the steam and feedwater cycles, otherwise plant efficiency suffers.

Pipelines in most plants are relatively short and, therefore, their radiating surface small in comparison to heat containing vessels. Deaerators, evaporators and feedwater stage heaters all have large surfaces enclosed in high temperatures. Therefore good thermal insulation must be used on such units to prevent excessive heat loss.

The Kansas City Power & Light Company, Kansas City, Missouri, solved this problem a few years

ago in its Hawthorn Station by covering these vessels with Foamglas, a cellular glass insulation resistant to high temperatures and impervious to moisture.

The combination of high temperature plus large surfaces also called for an insulation of compatible expansion ratio and of rigid structure to withstand banding strains without deformation. For instance, the evaporator illustrated here, with an outside diameter of 5 ft and a length of 24½ ft, has an exposed surface of more than 400 sq ft, which required appreciable tension in the long bands. Operating as it does, at 400 F requires that the insulation remain snugly in place for maximum effectiveness.

Adequate insulating properties

are obtained for this temperature with 2-in. thick Foamglas. The deaerator and storage tank (not illustrated), also operating at 400 F, have a similar 2-in. covering of the cellular glass insulation. The combination has an area of more than 1,344 sq ft.

Higher temperatures, causing correspondingly higher heat loss, require thicker insulation. The feedwater stage heaters which operate at 700 and 750 F, therefore, are each fitted with two 2-in. layers of Foamglas. Although these units measure only 3 ft in diameter, they are 17 ft high, and have more than 166 sq ft of surface area each, a high potential heat loss source if not adequately insulated. The illustration shows method of application.

WELBOND[®]

is the valve

for high pressures
for high temperatures



Welbond Valves are winning acceptance among modern steam plants for all high pressure, high temperature valve service.

Superheater vents and drains, water wall drains, water column emergency shut-off, strainer blow-off, economizer drains—are just a few places where Yarway Welbond Valves are proving their mettle.

These special Welbond features insure improved valve performance:

- Stem of 321 stainless steel, used with special packing to prevent stem corrosion
- Easy and quick accessibility. All working parts removable through yoke. Jack action of stem forces out old packing
- Non-distorting, thermally-compensated seat
- Ventilated, easy grip handwheel
- Streamlined flow through body

For full information, ask your Yarway man or write for Bulletin B-452.

YARNALL-WARING COMPANY

Home Office:

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Southern Representative:

Roger A. Martin, Bone Allen Bldg., Atlanta 3, Ga.

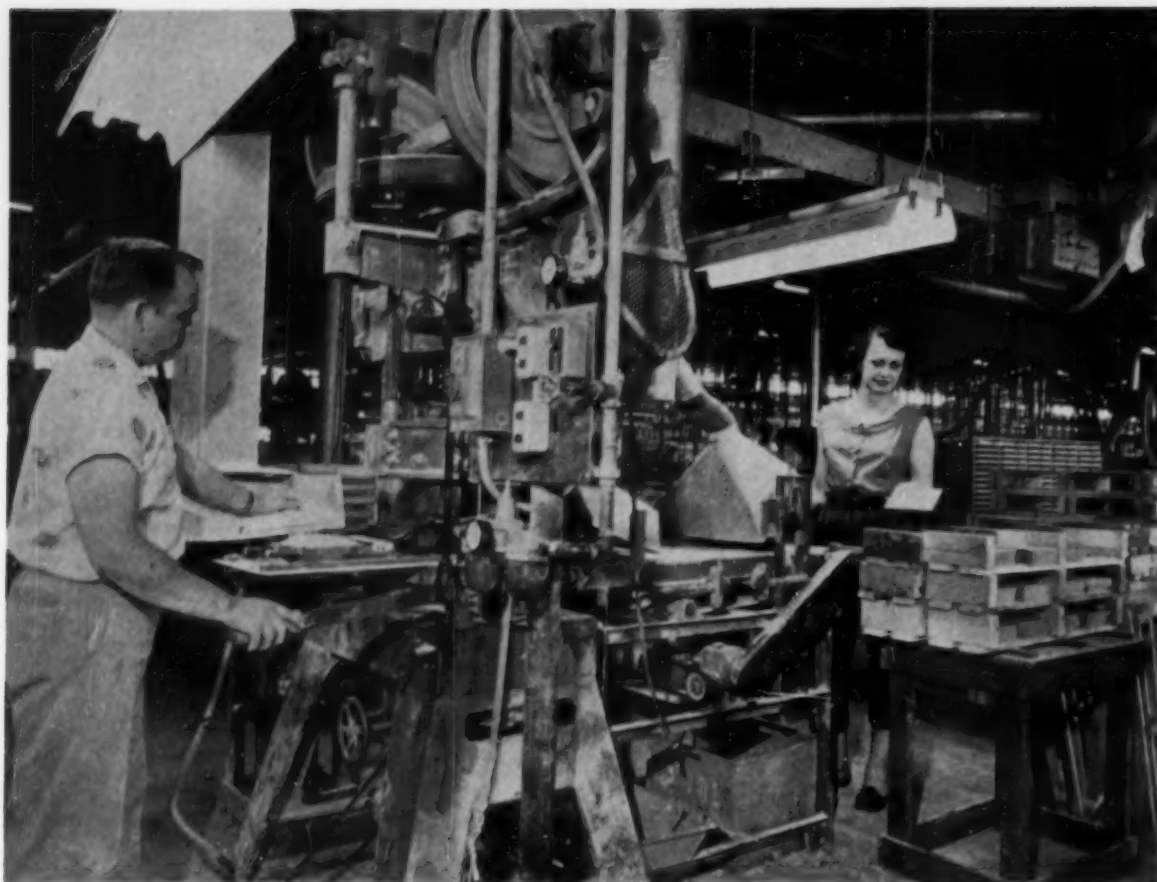


Yarway Welbond Valves are available in nine sizes, 1/4" to 2 1/2", angle and straightway designs. Pressures to 2500 psi, temperatures to 1050° F.

YARWAY

WELBOND

... a good way to specify
high pressure/high temperature valves



One of 18 tile presses at Stylon Southern Corporation's Florence, Alabama plant.

CERAMIC TILE New Florence, Alabama Plant

IMPORTANCE of water and air in industrial processes is well illustrated in the new plant of the Stylon Southern Corporation.

In this plant, which has a capacity of about 330,000 pieces of tile a day, water forms part of the ceramic mix from which the tile is made, is part of the glaze, and also is used to wash the chain which carries the tile through the glaze booths. Compressed air actuates the presses that shape the tile, is used to spray the glaze, and to blow off any surplus water after the chain is cleaned.

Because assured supplies of water and air are essential, special attention was given to the piping installation, ranging from the 12-in. air headers to $\frac{1}{4}$ -in. pipes that

serve individual operations. The Hall Plumbing and Heating Company, of Florence, was the plumbing contractor. More than 5,000 ft of Spang steel pipe, made by the Spang-Chalfant Division of The National Supply Company, is used throughout the building.

The process begins with the making of the ceramic mix, formed from clay and talc to which 8% of water is added to give the proper consistency for compacting. The mix goes into continuous storage, from which conveyor belts carry it to the presses as required to produce 20,000 to 30,000 sq ft of tile a day. From the presses the "green" tiles are conveyed on chains through eight booths, where glaze is applied as tile passes un-

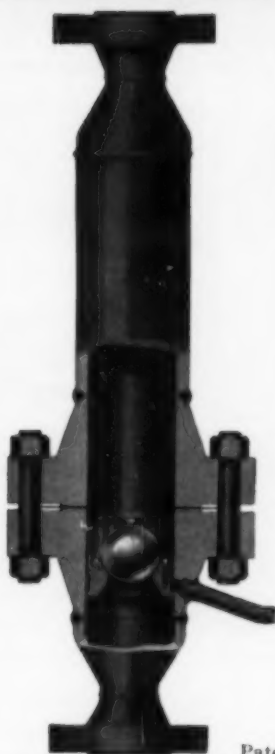
der a series of spray nozzles.

The glaze consists of non-metallic earthy substances such as clay, feldspar, flint, or special commercial fluxes called frits, plus a specific commercial stain made from metal oxide, to which the proper amount of water is added.

After glazing, the tiles are conveyed into kilns, where they are fired for 22 hours reaching a final temperature of 2000 F.

Stylon Corporation, one of the nation's leading ceramic tile manufacturers, was organized in 1949, beginning its operations at Milford, Mass. Stylon Southern Corporation built its original plant at Florence, Ala., in 1954, and recently completed its second plant there, sharing a 20-acre site.

C-V NEWS NOTES



Variable-orifice desuperheater for precise temperature control

Using a weighted steel ball for controlling the orifice opening, the new Copes-Vulcan Variable-Orifice Desuperheater assures close control of reduced steam temperatures regardless of load variations. Mixing and vaporization of cooling water and steam are so complete that reduced steam temperature can be held constant only 20 feet downstream from the desuperheater outlet — even over a 50-to-1 load range.

Unique design eliminates the need for excess piping, atomizing steam, spray nozzle or glands. No excess water needs to be removed from the stream.

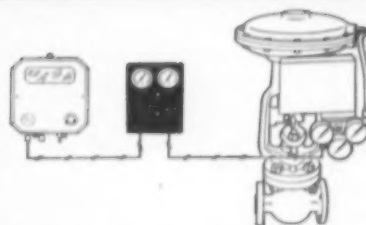
The Variable-Orifice Desuperheater is one of a complete line — each type engineered to meet particular operating conditions. Copes-Vulcan designs each station to meet individual requirements. Write for details.

Patent applied for



Two basic valves built to handle more jobs

With the new diaphragm-actuated Type CV-D and piston-actuated Type CV-P valves, Copes-Vulcan offers new simplicity in design, wider flexibility in application for remote control service. Type CV-D is reverse or direct acting in sizes up to 14-inch at unlimited pressures. Type CV-P is ideal for highest valve-operating force, and precise positioning. Write for Bulletin 1027.



Pneumatic control stations simplify performance . . . maintenance

This Remote-Set AMS-4 Station is used with pneumatic stacked-diaphragm controllers . . . provides adjustable set-point loading or independent manual operation. Copes-Vulcan builds auto-manual stations in Standard, Remote-Set and Cascade types, and Manual Loading and Miniature Stations. Write for Bulletin 1031.



COPES-VULCAN DIVISION
BLAW-KNOX COMPANY
ERIE 4, PENNSYLVANIA



The design of

lower overall height saves on initial construction costs

AIR HEATER

PRIMARY HEATER

PRIMARY SUPERHEATER

ECONOMIZER

EXPOSED INSULATOR INLET

EXPOSED INSULATOR OUTLET

HT BURNER

BURNER

THROTTLED INSULATED FLAME BURNER

H. A. H. H.

the future that's HERE!

the RILEY TURBO FURNACE

No major alteration in pressure parts when changing from gas and oil to solid fuels

Same furnace exit gas temperatures with all fuels

Slag blowers may be eliminated

No stratification of furnace gases
Furnace walls stay clean

High turbulence and long residence time of fuels promotes negligible carbon losses

Directional flame burners for multiple fuels

Burner location on one level permits turbine level operation

With Flyash reinjection, unburned losses are negligible

Slag tapping with reinjection eliminates flyash disposal problem

The unit illustrated is being built at Sterlington Station for Louisiana Power & Light Company. Steam capacity—1,600,000 lbs./hr.—2125 psig, 1005 F. Reheat. Fuel will be gas and oil initially. Pulverized coal, fluid coke or lignite can be fired at anytime in the future.

The Riley TURBO FURNACE Boiler Design has enjoyed a remarkable acceptance since it was first introduced late in 1954. Because of its versatility it has been incorporated into boiler capacities from 150,000 up, reheat or non-reheat, pressurized and non-pressurized. The TURBO FURNACE has been purchased to satisfy numerous operating requirements: to be able to fire multiple fuels, for quick low cost conversion from gas or oil to coal or other solid fuels, to burn fluid coke as a major fuel, to eliminate slagging and slag blowers, to refire flyash and thus eliminate flyash disposal. Twenty TURBO FURNACE units have been sold for industrial and central station installations totalling over ten million pounds of steam per hour. It will pay you to investigate to get the full story on the extra dividends possible in a TURBO FURNACE unit.

A survey of your plant by a consulting engineer could show ways of making surprising savings in your power costs.



RILEY

Stoker Corporation
WORCESTER, MASSACHUSETTS

Sales Offices: Worcester, New York, Philadelphia, Buffalo, Pittsburgh, Cleveland, Detroit, Chicago, Cincinnati, Charlotte, New Orleans, Atlanta, St. Louis, Kansas City, St. Paul, Houston, Salt Lake City, Los Angeles, San Francisco, Portland, Seattle.

How to Get a Job

THE PROBLEM of getting a job can be discussed in five simple and direct phases: (1) self-inventory, (2) professional aids, (3) choosing your field, (4) campaigning, and (5) continuation.

(1) SELF-INVENTORY

In the first phase, you should take considerable time in making a self-inventory of your abilities, aptitudes, likes, dislikes, strong points and weaknesses. At this stage you do not need any professional help, but you should try honestly to evaluate yourself, bearing in mind that the three main principles in job-getting and job-keeping will be: the ability to work, the desire to work, and the ability to get along with other people.

Ask yourself if you prefer to work with a lot of people, alone, or with only a few people? Do you like to travel? Do you prefer outdoor work or office work? Do you like to work with your hands? Amateurish as your self-inventory might seem, it should be your starting point — the first phase of getting a job.

(2) PROFESSIONAL AIDS

The second phase of getting a job requires research and study. You should make a thorough check of the professional aids that you might use.

All good libraries have publications telling about the various types of American businesses and industries. Such publications as *Career*, *Engineers' Job Directory*, *College Placement Annual*, and others will be of great use to you.

Also remember that from the point of view of both the job-seeker and the seeker of good employees there are a number of agencies that will give professional help. Among these are: state employment agencies, civil service offices, private employment agencies, college and university place-

ment directors, vocational school counselors, high school counselors, and technical institute counselors.

These agencies are prepared to help you get a job. Most of them are fully equipped to give you vocational guidance tests that will help you determine the types of jobs that you are best qualified to hold. Then they can help you examine requirements of various occupations.

(3) CHOOSING YOUR FIELD

In the third phase, you should again take a self-inventory — but in a more practical way. You should now try to gather information that will aid you in determining exactly what you want to do.

You will need specific information about industries and businesses. Again, literature in libraries and the professional agencies will help you, but the main activity should be one of self-research.

You should try to determine such items as these: Where are you willing to live? What kind of products are you interested in? What types of industry or business fascinate you most? Do you wish to create or do research work on products? Do you wish to design products? Do you wish to manufacture products? Do you wish to sell or promote the sale of products? Do you wish to distribute products? Do you wish to help maintain, install, and repair products? Or do you prefer a type of service job in regard to the people who are performing the above functions? By this we mean those activities such as personnel, office management, accounting, clerical work, etc.

In this phase, with the help of available literature and professional agencies you can make a practicable chart showing the degree of your interest in each of the various types of industries or businesses: transportation, mining, merchandising, life insurance, industrial insurance, construction,



By FRED W. AJAX

Placement Director
Georgia Institute of Technology

electronics, heavy machinery, electrical, oil, chemical, textile, public and private utilities, municipal, county, state, and governmental agencies, advertising and sales promotion, banking, investments, entertainment, and the various types of work available in the many professions like medicine, dentistry, nursing, law, etc.

(4) CAMPAIGNING

Having completed the first three phases, you should then be ready to actually campaign for your job. You will already have some specific company names on your prospect list. And other possible employers will be revealed as campaigning continues.

As stated under *Professional Aids*, there are many agencies that will help you. Also, personal contacts will reveal leads, and even some of the employers interviewed may give valuable leads regarding openings in other companies.

Jobs are secured by personal interviews. Interviews are usually set up by the prospective employer after he has studied your letter of application and your qualification record. Sometimes an appointment for interview is made directly by telephone, but even so your qualification record or resume of previous activity is very important. The employer may want your record in advance of the interview, or

he may ask that you leave it with him on your first visit. In many cases the person that interviews you must discuss your qualifications with others in his organization and needs your record to set before them.

We shall not attempt to give an example of a good qualification record here, but you can very easily secure aid in the preparation of this important item by using the professional agencies listed above or by consulting numerous books on the subject.

Needless to say, the qualification record should be concise, complete, and accurate. It should give all pertinent details concerning your vital statistics, educational background, experience, and references. In most cases a small photograph should be attached to the qualification record. Letters that are sent to the companies should be very brief because the qualification record should always accompany the letter of application.

In the personal interview, you should always be neatly dressed and should emphasize what you believe you can do for the company, rather than what you expect to get. Try to be as normal as possible; display enthusiasm about the product and type of job offered by the company; and always be polite and courteous. A "thank you" note after the interview always makes the best follow-up.

(5) CONTINUATION

Never stop learning. After you have secured a job, you should always bear in mind that you are only a member of the team that makes your company succeed, a team that is composed of the president and all other personnel, down to the janitor. Learn how to be a valuable, wanted member of the team.

You must always remember that the success of a company depends upon personnel, products, and profits. All three are essential to a successful business. Learn how they fit together in your company. Your performance on any job will be measured by your influence on The Big Three — Personnel, Products, and Profits.

NOW SUBOX PAINTS ACTIVELY COMBAT CORROSION

Subox paints go far beyond the passive protection of inert paints. The chemically-active suboxide of lead in Subox paints actually works continuously to combat corrosion, as illustrated by these photomicrographs:

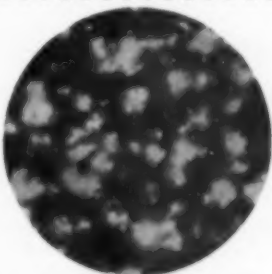
LEAD-SUBOXIDE PARTICLES

Lead-suboxide is a colloidal pigment which assures maximum penetration of a surface . . . packs to form a dense, impervious film. Two coats of Subox usually give the coverage of three of other paints . . . often, one coat of Subox is enough.



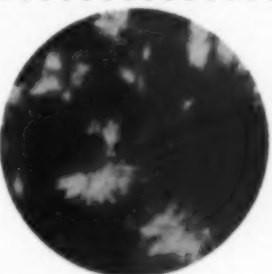
FIELD OF LEAD SOAPS

As soon as Subox is dry, lead-suboxide begins to react with the fatty acids of the vehicle to form insoluble lead soaps whose fibers bear metallic lead. These fibers intertwine to continuously build up a reinforcing film of protection.



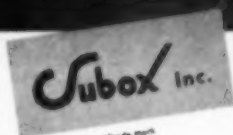
FIBROUS STRUCTURE OF LEAD SOAPS

The fibrous film gradually strengthens and replaces the original vehicle film which otherwise would have become brittle and have largely lost its protective power and adhesion.



Subox paints are the only American paints made with lead-suboxide. They are economical to apply, endure for years and largely eliminate the need for scraping and repriming when repainting is required.

Write for the brochure "Subox Paints".



Established 1924

6 Fairmount Plant
Hackensack, N. J.

Before you buy any boiler compare quoted prices with **REAL COSTS**



New Cleaver-Brooks cost analyzer clears "quotation" confusion — reveals **ALL** costs

Get *all* the costs... the *real* costs... down on paper before you recommend or specify a boiler to your clients. On many boiler installations "quoted prices" seldom agree with the total costs, as you may have learned. This is frequently the case with so-called "built-up" boilers assembled on the site.

Cleaver-Brooks' cost analysis enables you to compare all material costs (boiler, steam trim, burner, refractory, controls and other equipment) and installation labor costs. You'll know the "real costs" on the complete installation before you start.

Real eye-opener

The figures you'll see may be startling. In most cases the cost analysis proves a Cleaver-Brooks costs *less*. On-job time is dras-

tically reduced because Cleaver-Brooks packaged units are fully assembled, ready to install. Cleaver-Brooks boilers give you more in performance, too... each boiler is fully fire-tested at the factory under load, tuned to peak economy. Starting service and on-the-job operator training by authorized field engineers further decreases your over-all costs.

Contact your Cleaver-Brooks agent

Once you add up all the benefits of a Cleaver-Brooks "one-cost" package... the proved trouble-free economy of exclusive four-pass, forced-draft design, you'll find it pays over and over to analyze costs carefully before you buy. See your Cleaver-Brooks agent for details or write Cleaver-Brooks Company, 305 East Keefe Avenue, Milwaukee 12, Wisconsin, Dept. P.



Choose from 19 sizes, 130 models, 15 to 600 hp. Oil, gas and combination oil/gas fired — steam or hot water for heating or processing.

Cleaver-Brooks

ORIGINATORS OF SELF-CONTAINED BOILERS

Faster Connection

HIGH PRESSURE closed feed water heaters must be cleaned from time to time to keep plants at their maximum efficiency. When heaters are removed for maintenance work the cost of generation goes up, due to decrease in feed water temperature. Therefore, haste in cleaning is desirable.

All of our closed feed water heaters are arranged for acid cleaning of the inside of tubes. These acid cleaning connections are made of 2-inch heavy duty pipe welded into the 10-inch feed water line. The end of each 2-inch pipe was closed by use of a sealed weld cap.

OLD PROCEDURE: When the heater was removed from service and properly cooled, the seal weld cap was cut off and another piece of heavy duty pipe with a thread on one end was welded to the feed line. Then a screwed type gate valve was attached to this pipe and the acid cleaning equipment was attached to the valve. When the cleaning was completed, a sealed weld cap was screwed onto the nipple and welded in place. After test the heater was returned to service. With the above arrangement at times we were held up because all welding must be performed by a certified Welder.

NEW PROCEDURE: The seal weld caps are removed and in their place a tongue type high pressure forged steel flange is welded to the nipple. The opening in flange is closed by a grooved forged steel flange and gasket.

We made a grooved type flange to fit the tongue flange on the heater and into this flange the fittings are attached for acid cleaning.

When cleaning work has been complete the homemade flange is removed and the maintenance men install a new gasket in the grooved blank flange and bolt it to the tongue type flange on the heater pipe. After the test the heater is returned to service.

By **GEORGE G. AVANT**
Wilmington, North Carolina

NEW!

the **anco** NO-MO line of products

for
heating systems



**PREVENTS RUST AND CORROSION IN BOILERS
NEUTRALIZES CARBONIC ACID IN CONDENSATE • REDUCES SLUDGE
IN FUEL OIL • REMOVES SOOT FROM FLUES AND STACKS**

The new, NO-MO line of products is designed to prevent the damaging effects of water in circulating lines and boilers and to increase the efficiency of your fuel oil heating system. With your heating system in constant use during the winter, and possibly other seasons, preventative maintenance now can often save you thousands of dollars in costly replacements which have been brought on through the chemical reactions of water on metal. The NO-MO line provides inexpensive, effective protection for your systems.

anco NO-MO-CO₂

This is a volatile, neutralizing amine for the protection of steam and condensate lines and all radiators in hot water heaters and boilers, steam heating boilers and small industrial boilers. Available in one quart cans. One can is sufficient to treat 3,000 gallons of water.

anco NO-MO-RUST

This highly effective formula minimizes the corrosive electrolytic current promoted by oxygen

and carbon dioxide found in most natural water. By forming a protective coating on metal surfaces NO-MO-RUST safeguards the boiler, pump, heat exchanger, piping, valves and unit heater. Available in 2-lb. and 10-lb. containers.

anco NO-MO-SLUDGE

This liquid fuel oil additive reduces the formation of insoluble residues and sludges, and acts to disperse and maintain these insolubles in a finely divided state. NO-MO-SLUDGE will lower maintenance cost and provide greater efficiency from your fuel oil system. One quart will treat 1,000 gallons of light fuel oil.

anco NO-MO-SOOT

This free-flowing powdered compound aids in the removal of soot and carbon deposits from furnaces, flues, chimneys and stacks. Air flow will increase and you will eliminate the need for costly mechanical removal of soot when you use the **anco** NO-MO-SOOT.

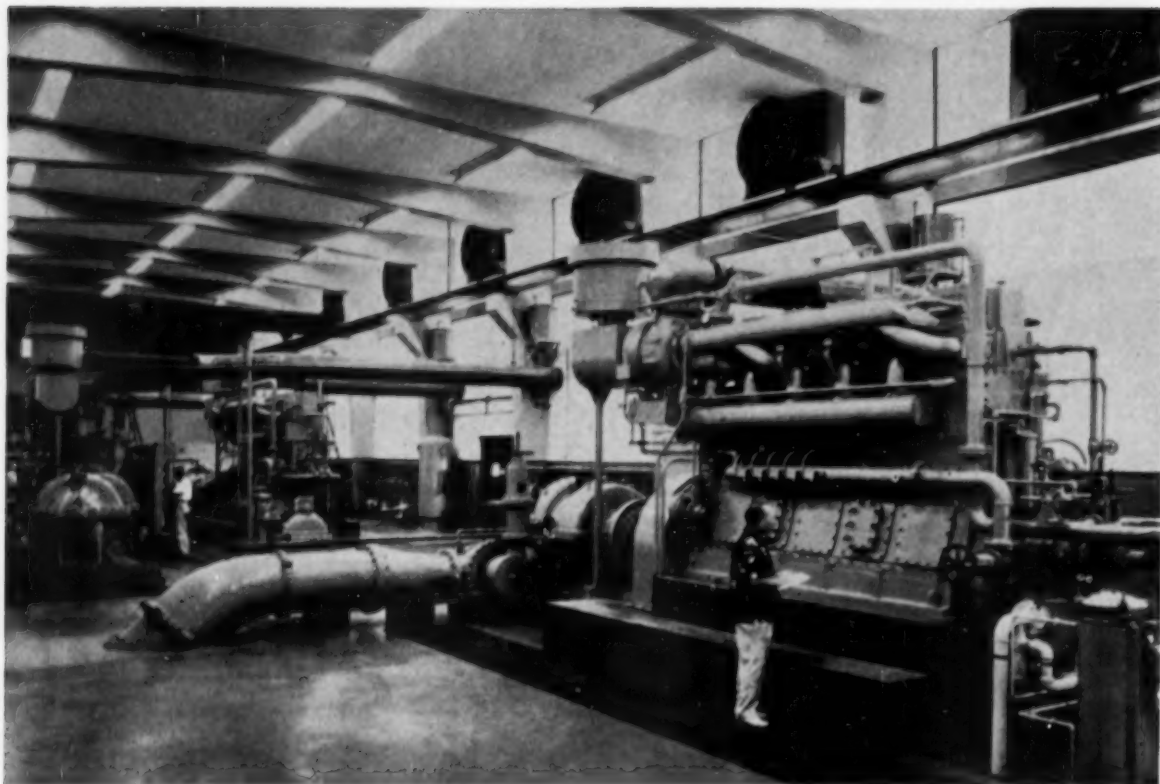
These products are handled by heating and air conditioning service companies throughout the Southeast. Write direct for name of your nearest dealer.

**SPECIALISTS IN MAKING
WATER BEHAVE**



Anderson Chemical Company, INC.

Box 1424 • MACON, GEORGIA • Phone 5-0466



Three of four Worthington 825 hp supercharged diesel engines, gear increasers, and pumps installed at new Miami Water Treatment Plant.

Miami Diesel Pumping Report

THREE YEARS ago the City of Miami installed four Worthington 825 hp, 450 rpm diesel pumping units in its new Alexander Orr, Jr. Water Treatment Plant.

After the first two years of service, the operation and maintenance men at the plant report they have not had to replace any piston rings, cylinder liners or bearings because of wear. The engines have run over 32,000 total hours without any forced shutdown or failure.

Roy Wine, maintenance superintendent of the plant, attributes much of the success of the operation of these diesels to a rigid inspection and maintenance schedule that has been in effect since the units went on the line. Careful

records of each engine's performance since the original start-up have been kept. The accompanying table gives an operation and maintenance summary.

Serving the demand conditions of the water distribution system, the diesel pumping units can be operated at varying speeds be-

tween 405 and 450 rpm. Water output per unit can vary from 8 mgd up to 18 mgd, depending on head and rpm, without overloading the engine. This ability to operate between 405 and 450 rpm has made it possible to vary the output of the plant from 8 mgd up to 64 mgd in infinite steps.

Operation & Maintenance Summary 1955 & 1956. Water Pumped = 16,019 M G.

Engine	Total Hours Operated	Hours Operated	Fuel Oil	Lube Oil	Material Costs of Oper. & Maint.
No. 1	6,438	4,548	150,802	836	\$ 820
No. 2	8,218	6,605	213,932	1,474*	981*
No. 3	9,156	7,324	241,931	2,053	1,310**
No. 4	8,292	6,232	205,305	1,167	1,465
	32,104	24,709	811,970	5,530 Gal.	\$4,576

* Includes 190 gallons oil change. ** Includes new rings which appeared to be in good condition, but were replaced to eliminate possibility of another shutdown in near future.

Management Training

EVEN in our relatively small organization (150 employees), we felt a need for better cooperation and communication between departments. It was also felt that a clearer dividing line of responsibility was necessary, because by pin-pointing responsibility, "buck passing" could be greatly reduced.

Understanding the other man's job, and by this understanding, working more closely toward a common goal, was our objective.

A scheduled program consisting of weekly one-hour meetings was arranged. All department heads and foremen were asked to attend. The meetings were held after plant hours. A social period for soft drinks and potato chips consumed the first ten minutes of each one hour meeting. Then there was a 25 minute talk and a 25 minute discussion.

Each department head and some foremen gave twenty-five minute talks about subjects assigned to them. Sample subjects: Sales Department Policies; Machine Design and Development; Accounting Department Duties; Preventive Maintenance.

The discussion periods which constituted the last twenty-five minutes of each meeting was devoted largely to questions and answers. Quite a few misconceptions were cleared by these periods, and some helpful suggestions came as a result of the questions.

The results of a program such as this are hard to determine because of their intangible nature. Nevertheless, we feel that a closer knit organization now exists and a better understanding of the problems that management faces has been given to all.

By **DUNCAN B. CUTLER**,
Chief Engineer, The Woodman
Company, Inc., Decatur, Ga.

USE SPI READER SERVICE

See Page 99

Dependable as "Old Faithful"

**LUBRICATION
AGAINST
30,000 P.S.I.G.**

**MANZEL
LUBRICATORS**

are designed to safeguard your
expensive machinery with positive force
feed lubrication. Choice of models to
meet any need, with fully adjustable pumping
rate. Experienced field engineers
available for consultation at any time.

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COMPLETE
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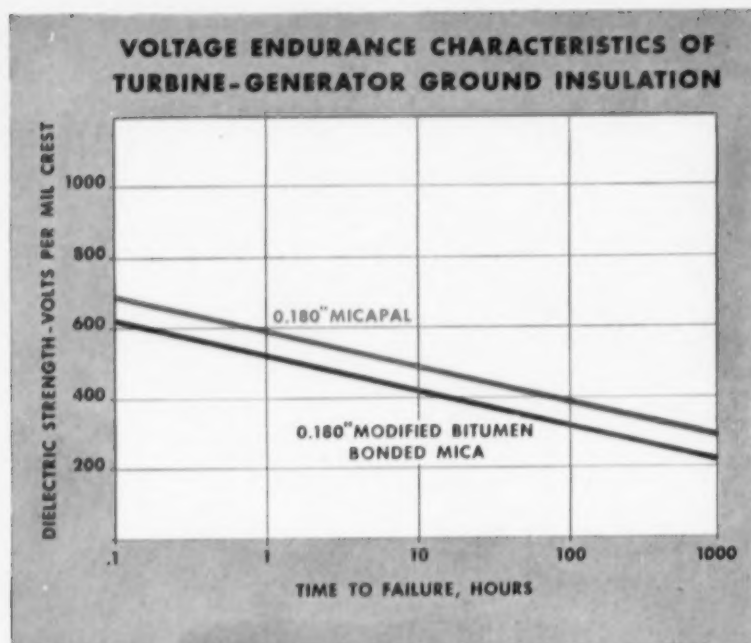


Manzel

LUBRICATORS • CHEMICAL FEEDERS • SLURRY PUMPS

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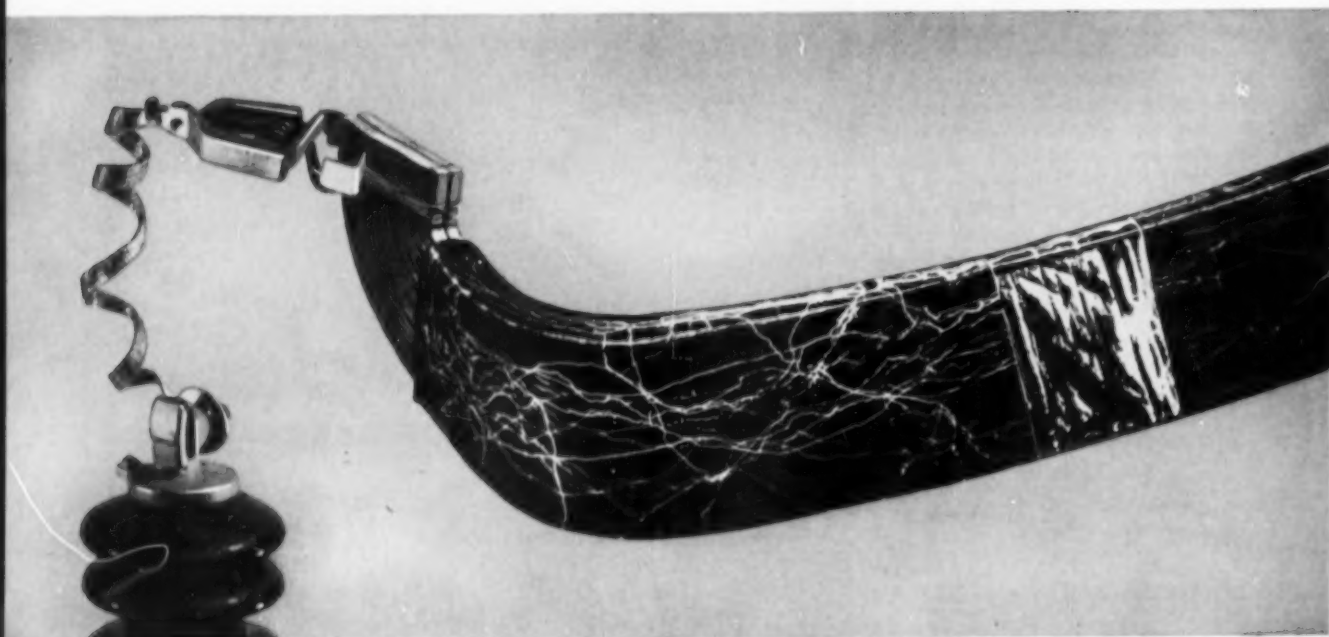
A Division of Houdaille Industries, Inc.



SIGNIFICANT IMPROVEMENT is noted in voltage endurance obtained for any duration of voltage application on Micapal compared to presently accepted generator insulating material. This improved voltage endurance increases long-term turbine-generator availability.

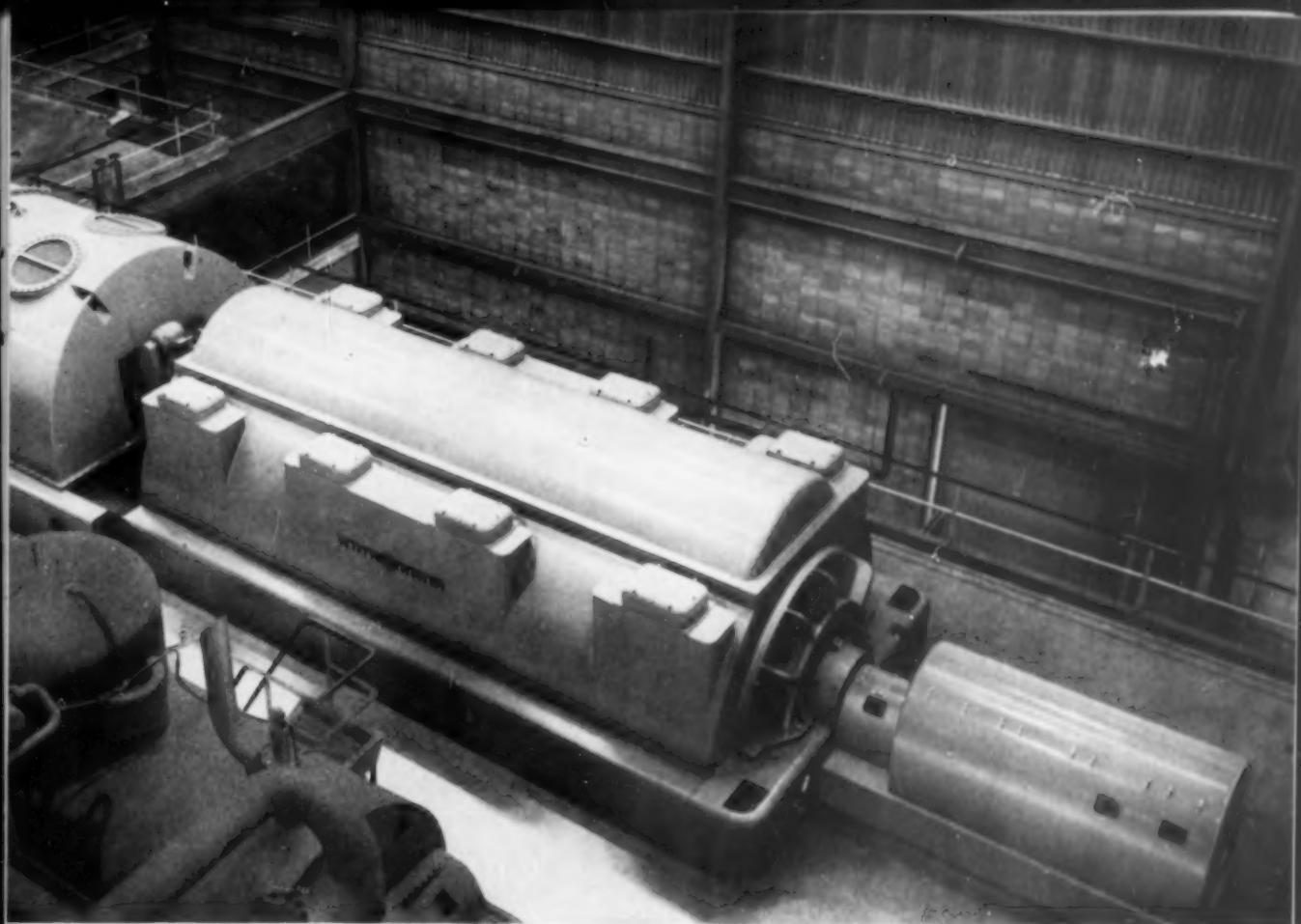
MICAPAL INSULATION better withstands high voltages and variable stresses caused by differential thermal expansion and contraction in large generator stator windings. Micapal is used on this 183,824-kva generator installed at Pacific Gas and Electric's Morro Bay Station.

How General Electric Micapal



INSULATION TESTS such as pictured here are used to compare the dielectric breakdown of different insulations. Forced to carry voltages far above their rating, test bars

of various types of insulation first develop corona streamers, then finally fail, enabling engineers to measure the insulation's actual voltage endurance.



insulation extends generator life

IMPROVED INSULATION BETTER WITHSTANDS HIGH VOLTAGES, VARIABLE STRESSES

Now, after extensive research and four years of operating experience, General Electric announces the extended application of Micapal insulation for high-voltage stator windings. A major advance in providing still longer, more reliable operation, this mica-based insulation offers these distinct advantages:

Greater Tensile Strength. Micapal incorporates mica mat and some mica flake bonded with a duplex thermosetting resin. Mica mat is finely divided, reconstituted mica formed into sheets. The thermosetting binder, combined with uniform mica structure, makes Micapal much tougher at operating temperatures than earlier insulations.

Greater Dimensional Stability. Micapal is molded to the precise shape of generator armature bars. Because of thermosetting qualities, the insulation won't flow or lose shape. It possesses great mechanical strength over the full range of operating temperatures.

Improved Thermal Conductivity. Micapal removes heat from electrical conductors more easily. The result is that for a given current and same insulation thickness, the armature bar runs cooler.

Improved Dielectric Breakdown Strength. The voltage endurance characteristics shown on the chart, above, illustrate how Micapal insulation withstands a much higher voltage than other mica insulation for any given period of time. The impulse puncture structure of Micapal has been shown by laboratory tests to be higher by an even greater factor.

Improved Micapal insulation is just another example of General Electric steam turbine-generator progress in meeting tomorrow's power demands. For more information on new generator developments, write Large Steam Turbine-Generator Department, General Electric Company, Schenectady 5, New York.

254-41

Progress Is Our Most Important Product

GENERAL  ELECTRIC

Bolt Tightening Rules

IF STRENGTH of the joint is your only concern in an assembly, it's almost impossible to get the nut too tight, according to fastener specialists at Russell, Burdsall & Ward Bolt and Nut Company. If wrenching up hard doesn't break a bolt it will never break or wear out in service — presuming it's the right bolt for the job.

The tension left in a bolt after

it's tightened opposes the external load applied in service and keeps the nut tight. So long as preload tension—clamping joint members together—is greater than external load, the bolt won't fail. Maximum pre-load tension means maximum resistance to external stress.

Under tightening may affect joint strength, but "over tightening" never does. However, there are applications where too much tightening is bad:

1. When the man with the wrench gives all he's got in tightening up a joint the bolt will

probably stretch permanently, deforming the threads a little. This doesn't affect strength, but nut and bolt can't be reused. Therefore, where bolts are permanent fixtures, assemblers needn't worry about over tightening. Where fasteners may be removed in service, avoid tightening the bolt to the point where it is permanently stretched.

A steel bolt stretched in tightening no more than 0.001 inch (0.002 for heat treated bolts) per inch of grip length—distance between bolt and nut—will return to normal without deformation of threads.

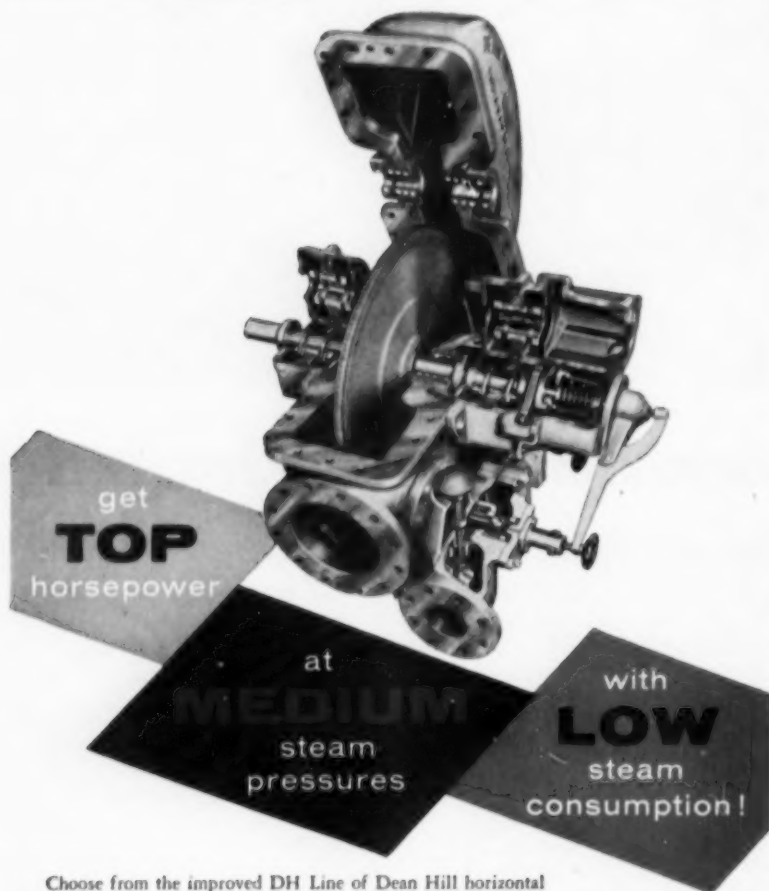
2. Where a soft-surfaced material, such as a gasket, is part of the joint, it's impossible to put much tension in the bolt. Tightening simply compresses the soft material. In this kind of joint, R B & W engineers recommend tightening the bolt just a little more than enough to hold the joint together under load.

More Direct Current

DIRECT CURRENT, in the early days the accepted electric power, but largely supplanted by alternating current in the past 75 years, is growing in importance, according to W. A. Munson, Westinghouse Electric Corp.

At a recent A.I.E.E. meeting, he emphasized that all trends indicate that the use of d-c is growing and will continue to increase, not only in kilowatt consumption but through more applications. This diversified demand emphasizes the great importance of properly planned systems.


"The need for higher rated and more efficient sources of d-c power can be seen in the vast amount of research that is being done to obtain better, smaller and more efficient units. The future will undoubtedly see fairly widespread use of the semi-conductor rectifiers, such as germanium, and silicone, as these devices offer the possibility of larger rated power sources from physically smaller units."



Choose from the improved DH Line of Dean Hill horizontal turbines which give you up to twice the power of earlier models while maintaining the same economy of operation.

The major change contributing to this tremendous power increase is the addition of steam nozzles to all models. On types now built with two nozzles—DH-10, DH-15, DH-20, DH-25—this change has meant a 100% increase in the maximum horsepower of each unit! On new three-nozzle models—DH-30, DH-35, DH-40, DH-45—the rated increase in maximum horsepower is 50%!

Why not get the complete power picture of Dean Hill's improved DH Line of horizontal turbines? Write today for Turbine Catalog, No. 500.

DEAN  **HILL PUMP COMPANY**
Pump and Turbine Engineers Since 1893
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OFFICES IN PRINCIPAL CITIES

STAINLESS STEELS

How you can use them to minimize the rising costs of maintenance & downtime

A SUPPLIER of corrosion-resistant piping visited a processing plant which was known to use highly corrosive acids; and, upon meeting the plant engineer, asked, "Do you have any corrosion problems?" Getting a negative answer, he asked, "Aren't you having any problems in piping these acids you handle?" The reply was "No! That's no problem. We use double extra heavy iron pipe and replace it every three months."

This might be termed the old philosophy of corrosion control, that is, *Use the Cheapest Material and Plenty of It*. On the other hand, increased recognition of maintenance costs, the effects of corrosion on product quality, and the value of downtime has led to a new philosophy of corrosion control, that is, *Use the Right Material, Properly Applied in the Right Quantity*.

Let us discuss the corrosion resisting qualities and limitations of stainless steels in order that they may be properly selected and applied to give the maximum benefits from their qualities and the minimum difficulties from their limitations.

Stainless steels are iron alloys which contain at least 12% chromium and, very often, 7% or more nickel. In addition to these, stainless steels may contain various percentages of other elements which are present as impurities or which are added in order to provide specific properties or to improve performance.

Let us define corrosion as the destructive alteration of a metal or alloy resulting from exposure to a reactive environment. The form and rate of alteration will depend on many properties of the material and the environment, such as, the presence of oxidizing agents, the properties of corrosion products, acidity, temperature, velocity, surface condition, etc.

Note in Fig. 1 that the presence of oxidizing agents can have a very significant effect on the performance

Material	Acid	Acidity per cent	Corrosion Rate, mdd.	
			Hydrogen-saturated Acid (No Oxygen)	Oxygen-saturated Acid
Mild Steel	Sulfuric	6	168	1,956
Lead	Hydrochloric	4	134	1,276
Copper	Hydrochloric	4	105	8,580
Tin	Sulfuric	6	35	4,391
Nickel	Hydrochloric	4	37	2,715
Monel	Sulfuric	2	6	571

Fig. 1. Effect of dissolved oxygen on the corrosion of some metals by acids at atmospheric temperature.

of most metals and alloys. The corrosion rate differs considerably, depending on the absence or presence of oxygen.

With certain other materials, however, oxidizing agents tend to inhibit corrosion by the formation of a very resistant film, and one such material is the metal chromium. For example, chromium behaves much better than silver in an oxidizing atmosphere, although it is much more active chemically than silver. On the other hand, in an acid environment, in the absence of oxidizing conditions, silver is unaffected, and chromium is rapidly decomposed. Fortunately, in the battle against corrosion, chromium is able to contribute this inhibiting effect to other metals with which it may be alloyed, and it is this property of chromium which is responsible for the principle corrosion-resistant characteristics of stainless steels.

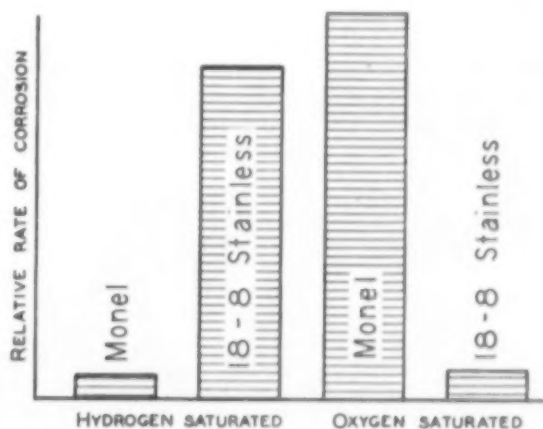


Fig. 2. Chart shows relative corrosive effects on stainless steel and Monel metal due to either dissolved oxygen or hydrogen in 3% sulphuric acid. In hydrogen-saturated acid, Monel has good corrosion resistance while 18-8 stainless steel is more durable in contact with oxygen-saturated acid.

This particular effect is illustrated in Fig. 2, which presents the relative corrosion rates of Monel and 18-8 stainless in an acid solution saturated, on the one hand,

Adopted from comments by JAMES P. KELLEHER before the Jacksonville, Florida Chapter, American Society for Metals. Mr. Kelleher is assistant manager of specialty products, Alloy Tube Division, THE CARPENTER STEEL CO., Union, N. J.

(Stainless Steels vs. Corrosion)

with hydrogen and, on the other hand, with oxygen. Note that these materials reverse themselves as far as relative performance is concerned, depending on whether the environment is non-oxidizing or oxidizing.

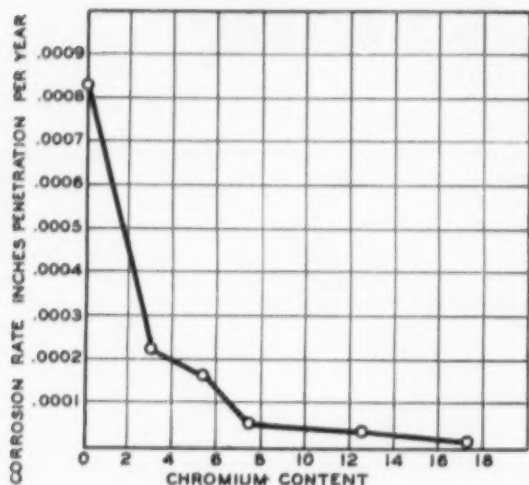


Fig. 3. Effect of chromium on the atmospheric corrosion of steel. Note that an increase in chromium content results in a reduced rate of corrosion.

Alloy 20	Alloy C	Titanium	Alloy B
25% Cr-20% Ni			inconel
25% Cr-12% Ni			nickel
18% Cr-12% Ni	2.5% Mo	monel	
18% Cr-8% Ni		cupro-nickel	
17% Cr		copper	
11% Cr		bronze	
5% Cr	brass		
	Steel		
	(unalloyed)		
		Halide ions of	
		Chlorine	
		Bromine	
		Iodine	
		Fluorine	
excess O ₂		excess H ₂	

THE Y OF CORROSION

Consider that we have a material selection problem and for various reasons of strength, heat, or otherwise, a metallic material other than carbon steel is desirable. If the environment is oxidizing in nature, we would choose the left fork of the "Y" and consider, first, the 5% chromium alloy which might be suitable for oxidation resistance at intermediate temperatures without chemical attack. If mild chemical attack is prevalent, we would progress up the "Y" to the 12% chromium alloy (Type 410), where stainless type alloys begin;

or, for slightly stronger attack, we might consider the 17% chromium alloy (Type 430).

At this point, we have just about obtained the full benefit of chromium alone, and progress to the chromium-nickel, or austenitic stainless steels, starting with an 18-8 alloy, such as Type 304. The nickel enhances the passivity of chromium and provides resistance to a much greater variety of chemical conditions. It contributes materially to weldability, promotes ductility, and provides an alloy with better all-around mechanical properties.

Our next step up the "Y" takes us to Type 316 in which the additional alloying of molybdenum strengthens the passive film and augments the corrosion resistance of chromium and nickel to concentrated attack frequently encountered with chloride-containing solutions.

Going further up the "Y", we might choose the 25/12 alloy (309), or the 25/20 alloy (310), where the additional alloying of chromium and nickel provides greater resistance to oxidizing conditions.

Finally, we arrive at Carpenter Stainless No. 20 which represents super-corrosion resistance, as far as stainless steels are concerned, especially where the corrodent is sulphuric acid or its salts. Displaced somewhat to the right, we might also choose Carpenter Alloy "C", which is not a stainless steel but a chromium-nickel-molybdenum alloy which may be of interest. It is an alloy which provides extraordinary resistance to strong oxidizing conditions and to such difficult corrodents as ferric chloride, cupric chloride, or hypochlorites.

If the environment had been reducing in nature, or if components, such as halide ions, were present which might tend to break down any passive film, the solution to the material selection problem should be sought on the right fork of the "Y". Under these conditions, it would appear more advisable to use copper or nickel-base alloys. Going up the right fork of the "Y", we would consider various alloys in this class and finally arrive at Carpenter Alloy B, a nickel-molybdenum alloy, which gives an excellent account of itself under reducing conditions, and which will resist the highly-corrosive action of hydrochloric acid at all concentrations and at all temperatures.

Displaced somewhat, we see titanium, a metal which is a relative newcomer in the field of corrosion resistance, but one which we will certainly be hearing a great deal about in the future. Outstanding among its corrosion-resistant properties is its near-immunity to chloride salts, and especially sea water, and the fact that any attack which occurs tends to be uniform and not localized in nature.

Types of Corrosion Encountered

General Corrosion means that the material is evenly attacked over the entire exposed surface. Velocity plays an important part in general corrosion and may have a pronounced effect on the corrosion rate of stainless steels. We have seen that corrosion resistance of stainless steels is attributable to a protective film on the surface. The effect of high velocity between a corrosive solution and a stainless steel surface may be either to prevent the normal formation of the film or to remove the film as it is formed. In either case, high velocities would have the effect of producing the type of corrosion which is generally known as erosion-corrosion. Carpenter Stainless No. 20 has exceptional resist-



both
perform
the
same
job...
but
there's
a
difference!

Steam plants all perform the same job, too... but there's a very decided difference when you choose AE's Vibra-Grate Stoker. For here's a stoker with everything... the advantages of others rolled into one entirely water-cooled, automatically controlled unit. The AE Vibra-Grate Stoker gives freedom from smoke and fly ash at both high and low ratings... eliminates need for dust collectors and cinder return systems... burns low-grade coals efficiently... is readily adaptable for burning gas or oil either singly or in combination with coal.

The Vibra-Grate Stoker feeds and moves the fuel automatically by intermittent vibrating motions, insuring even distribution and avoiding holes and light spots in the fuel bed. Its highly effective water-cooling system guarantees long grate life with proved maintenance of less than 2/10 cents per ton of coal burned.

The Vibra-Grate is years ahead in design efficiency, yet its over-all cost is low. If you're thinking of adding a new power plant or modernizing your present one, write today for details of the Vibra-Grate... you won't be disappointed.

Other outstanding stokers made by American Engineering Company are:

TAYLOR STOKER: an underfeed stoker for power requirements ranging from 20,000 to 500,000 pounds.

PERFECT SPREAD STOKER: a spreader stoker with spiral-type rotors and continuous chain feeders for both lateral and longitudinal coal distribution.

GRATE DRIVE... intermittent vibrating motion of grate. Electric timer determines frequency of vibration controlled by fuel and steam demand.

ADJUSTABLE ASH DISCHARGE... retards ash discharge until complete combustion is effected.

WATER COOLING... directly connected into the boiler circulation.

GUILLOTINE GATE... controls fuel bed thickness.

OVERFIRE AIR... provided for smokeless combustion.

DAMPER CONTROLLED AIR INLETS

GRATE SUPPORT... flexibly supported on division plates forming the zoned air sections of the windbox.

TUYERES... air supplied to fuel bed through high-resistance grate formed of tuyeres, embracing water-cooled grate tubes... insuring long grate life.



AMERICAN ENGINEERING COMPANY

Wheatsteeple Lane and Sepviva Street
Philadelphia 37, Pennsylvania

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Canadian Subsidiaries: Affiliated Engineering Corporations, Ltd.,
Montreal, P. Q., Bowden Industries Ltd., Toronto, Ont.

ance to this type of attack, and it is often used for the high velocity handling of solutions which are readily handled by lesser alloys under static or low velocity conditions. Examples of this would be the use of Alloy No. 20 in pumps, agitators, and valves.

If we could consider any type of corrosion to be preferred, it certainly would be general corrosion, since this type would permit prediction of the service life of a piece of equipment from its thickness. Any effect which would tend to localize corrosion makes any attempt at prediction very foolhardy. Although, under such conditions, the General Corrosion may progress at an undiminished rate, the unpredictable local corrosion is likely to be the most serious cause of failure.

Galvanic Corrosion occurs when two dissimilar metals are connected electrically, and immersed in a solution capable of carrying an electric current. Such conditions produce the accelerated corrosion of one metal, while protecting the other. The protected member is referred to as the nobler metal, or cathode, and the other, the anode. In such a process, there is a flow of electrical current which is equivalent to the acceleration of corrosion which occurs.

It is possible to arrange metals and alloys in a series which will indicate their general tendencies to form galvanic cells. Fig. 5 shows such a "Galvanic Series" with the materials arranged in order of decreasing tendency to corrode and the distance between any two members being a rough measure of the acceleration which could occur, if they were suitably joined. As an example, 18-8 stainless steel suitably joined to magnesium would result in rapid corrosion of the latter, while connecting a bronze alloy to copper might present little or no difficulty.

Corroded End (Anodic, or Least Noble)

Magnesium
Magnesium Alloys
Zinc
Aluminum
Cadmium
Steel or Iron
Cast Iron
Chromium-Iron (active)
18-8 Chromium-Nickel-Iron (active)
18-8-3 Chromium-Nickel-Molybdenum
Stainless No. 20 Alloy
Lead-Tin Solders
Lead
Tin
Nickel (active)
Brasses
Copper
Bronzes
Copper-Nickel Alloys
Silver Solder
Nickel (passive)
Chromium-Iron (passive)
18-8 Chromium-Nickel-Iron (passive)
18-8-3 Chromium-Nickel-Iron-Molybdenum (passive)
Stainless No. 20 Alloy
Silver
Graphite
Gold
Platinum

Protected End (Cathodic, or Most Noble)

Fig. 5. Galvanic Series of Metals & Alloys

One important consideration in Galvanic Corrosion is the area relationship between the anode and the cathode. A small anode and a large cathode results in a concentration of current on the anode, with a subsequent increase in the penetration of the metal due to corrosion. As an example, a steel rivet in a copper plate suffers very rapid attack, whereas a copper rivet in a steel plate does not result in any appreciable acceleration of the rate of corrosion of the steel plate. We should attempt to have the least noble metal in a galvanic couple present the largest area to a corroding solution.



Fig. 6. As pit type corrosion progresses, it becomes increasingly difficult for the active area to repair itself and become passive. As the pit gets deeper, the rate of penetration becomes more severe.

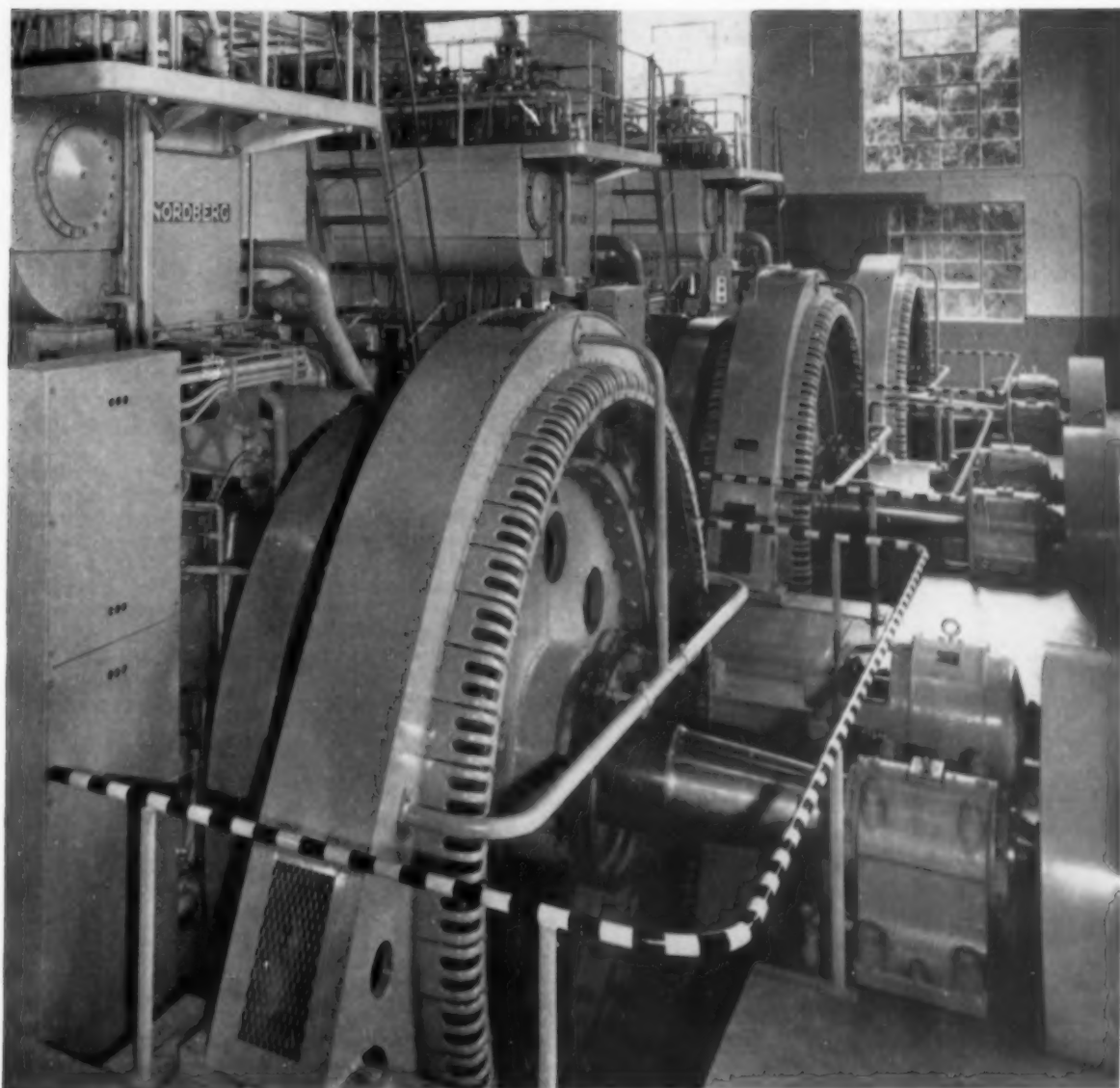
Pit-Type Corrosion — Note that stainless steels may change position in this series, assuming either an active or a passive condition. When this occurs, we have the next type of corrosion, shown in Fig. 6, and known as Pit-Type Corrosion. An activating agent, such as a chloride ion, may destroy the passivity at one point, and this point will then be less noble than the larger passive area, with the result being severe local corrosion at the active point.

You can well appreciate the insidious nature of this type of corrosion, since, as it progresses, it becomes increasingly difficult for the active area to repair itself and become passive. As the pit gets deeper, the rate of penetration becomes more severe. It is what might be called a "self aggravating" condition.

If process requirements will permit the addition, the use of some oxidizing agents will prevent the sustained activation of local areas on stainless steels and thus prevent this type of corrosive attack. Nitrate and chromate salts are typical examples of materials which would be helpful in this respect, and there have been cases where the purposeful injection of air was used for this purpose.

In stainless steels, the addition of molybdenum provides added resistance to this local activation and, where this type of attack has been experienced or is to be expected, a molybdenum-bearing stainless steel such as Type 316, Type 317, Type 329, or Carpenter No. 20, should be considered.

Concentration Cell Corrosion is very similar to the galvanic type of corrosion. Like Galvanic Corrosion, Concentration Cell Corrosion involves a flow of electrical current which intensifies corrosion in a particular area of metallic equipment in a corrosive environment. A simple difference, however, distinguishes



No Room for Error

Today's power machinery operates on close tolerances. The space available for lubricants at the actual point of friction is small. Lubricants *must* deliver full protection *in every drop*.

Throughout the South dependable, *steady* lubrication in power equipment has made Standard Oil lubricants the outstanding first choice for many years. There is no substitute

for these years of performance on the job.

If there's a doubt about lubrication in your plant remove it today. Just call in your Standard Oil lubrication specialist. He'll be glad to assist in drawing up a plan that will leave nothing to chance—and no room for error.

STANDARD OIL COMPANY (Kentucky)



(Stainless Steels vs. Corrosion)

between them. In Galvanic Corrosion, the current results from the action of a corrosive liquid on two unlike metals connected to each other. In a concentration cell, however, it results from a difference in concentration within a given liquid acting on a single metallic surface. There are two types of concentration cells to be considered. They are the "metal-ion" type and the "oxygen" type.

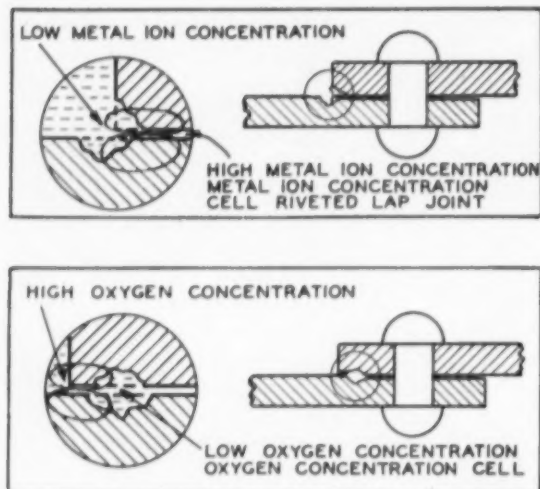


Fig. 7. Riveted lap-joint has produced a stagnant area in the overlap where metal ion concentration may build up. Same joint (lower view) may also set up an oxygen concentration cell.

A riveted lap-joint is shown in Fig. 7, which has produced a stagnant area in the overlap where metal ion concentration may build up. Outside of the overlap crevice, the metal is readily accessible to fresh corrosive solution so that the metal ion concentration will tend to be relatively low. The corrosive forces attempt to balance this situation by forcing more metal into solution at the point of lowest concentration, resulting in premature failure of otherwise sound equipment. This type of corrosion can occur with stainless steels but is more prevalent with copper-base or nickel-base alloys.

Note in the lower sketch that the same riveted lap-joint may set up what is known as an oxygen concentration cell. A crevice such as that produced by a riveted lap-joint will hinder the diffusion of oxygen and, as a result of this, there will be a difference in oxygen concentration in the system. Acceleration of corrosion will then occur at the point of lower oxygen concentration, or within the crevice. In the case of stainless steels, this type of cell can be extremely destructive since the low concentration of oxygen in the crevice may be insufficient to maintain the passive film upon which the corrosion resistance or stainless steel depends. In this case, we will have the active-passive galvanic cell, in addition to the oxygen concentration cell, making the corrosion rate quite severe.

The basic remedy for Concentrated-Cell Corrosion is to avoid not only crevices or deposits but any set

of conditions which will tend to set up non-uniform concentrations of either dissolved metal or oxygen over the stainless steel surface.

Intergranular Corrosion is a form of attack which is confined to non-magnetic austenitic chromium nickel types of stainless steels. When these steels are heated for an appreciable length of time between 800 F and 1650 F, they undergo a form of instability which results in the precipitation of carbon. This carbon migrates to the grain boundaries where it combines with many times its own weight of chromium, thus depleting the amount of chromium available in the areas immediately adjacent to these grain boundaries. Since the principal corrosion resistant properties of stainless steels are dependent on an adequate quantity of chromium, it can be seen that these areas are not as stainless as the balance of the alloy and are thus susceptible to selective corrosion by environments which would ordinarily present no problem.

The severity of Intergranular Corrosion will depend, to a great extent, on the time of exposure to the sensitizing temperatures. Short exposure during welding would be troublesome, but not as severe as holding the steel at sensitizing temperatures for a prolonged period. Likewise, if material is held at the same temperature for the same time, a lower carbon content would minimize the difficulties.

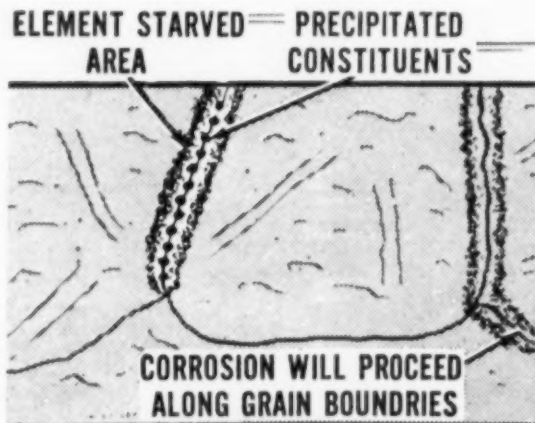


Fig. 8. Intergranular Corrosion

The original high corrosion resistance of stainless steels which have been sensitized may be restored by heating to a temperature of approximately 1850 F to 2100 F, depending upon analysis, and then rapidly quenching to a temperature below 800 F, thus minimizing the time in the sensitizing range. It should be pointed out that this solution to the problem of intergranular corrosion is only economically practical with relatively small pieces of equipment, and is rarely considered feasible in conjunction with field fabrication of any size.

The next solution to the problem of Intergranular Corrosion would be to decrease the carbon content of the stainless steel so that it would be somewhat sluggish in precipitating and, when precipitated, would be unable to combine with any large quantity of chromium at the grain boundaries. Holding the carbon content to a maximum of .03% is sufficient to avoid

harmful carbide precipitation during welding, and the use of the low carbon grades of stainless steel eliminates the need for heat treatment and permits the use of as-welded equipment at temperatures below 800 F.

The third solution to the problem of Intergranular Corrosion is the use of the stabilizing elements, titanium and columbium. The addition of titanium in the amounts of 4 to 6 times the carbon content, or columbium in amounts of 8 to 16 times the carbon content, greatly inhibits the changes associated with Intergranular Corrosion. These elements form carbides more readily than chromium and their presence will, therefore, diminish depletion of the chromium along the grain boundaries. Type 321 is the titanium-stabilized counterpart of Type 304 and Type 347 is the columbium-stabilized counterpart of Type 304. Other grades, likewise, have their stabilized counterparts. As with the low carbon grades, the stabilized grades of austenitic stainless steels are recommended where material must be welded or otherwise subjected to short time exposure to the sensitizing temperatures and where subsequent heat treatment is not practical. However, where equipment must be operated either intermittently or continuously at temperatures between 800 F and 1650 F, the use of stabilized grades of austenitic stainless steels is required. The columbium stabilized grades are usually preferred to the titanium stabilized grades in welding applications since titanium is reactive with gases at welding temperatures and is partially lost during a welding operation. For this reason, Type 347, containing the less-reactive columbium, is usually employed for weld rod in such applications.

Stress Corrosion for this discussion, will be considered the type of attack which causes preferential cracking on the metal.

Although relatively little is known about the actual mechanism which produces this type of corrosion, we do know that three requirements must be met in order to produce stress corrosion cracking in stainless steels. First of all, the material must be under tensile stress. Second, the corrosive environment must be of a type which will induce this corrosion. Several such corrosive media include acid chloride solutions, $\text{NaCl-H}_2\text{O}_2$ solutions, sea water, hydrogen sulfide, and sodium hydroxide-hydrogen sulfide solutions. Third, the structure of the stainless steel must be austenitic.

How can we prevent Stress Corrosion Cracking? The corrosive environments are usually tied directly to processing requirements, and any alteration of these environments is usually not practical, so that our solution to the problem resolves itself into elimination of the tensile stresses or the use of a material which is not susceptible to stress corrosion cracking. The tensile stresses may be removed by annealing the material, but this will be a relatively expensive operation and the subsequent cooling or quenching might be irregular enough to set up temperature gradients and re-establish stresses in the metal.

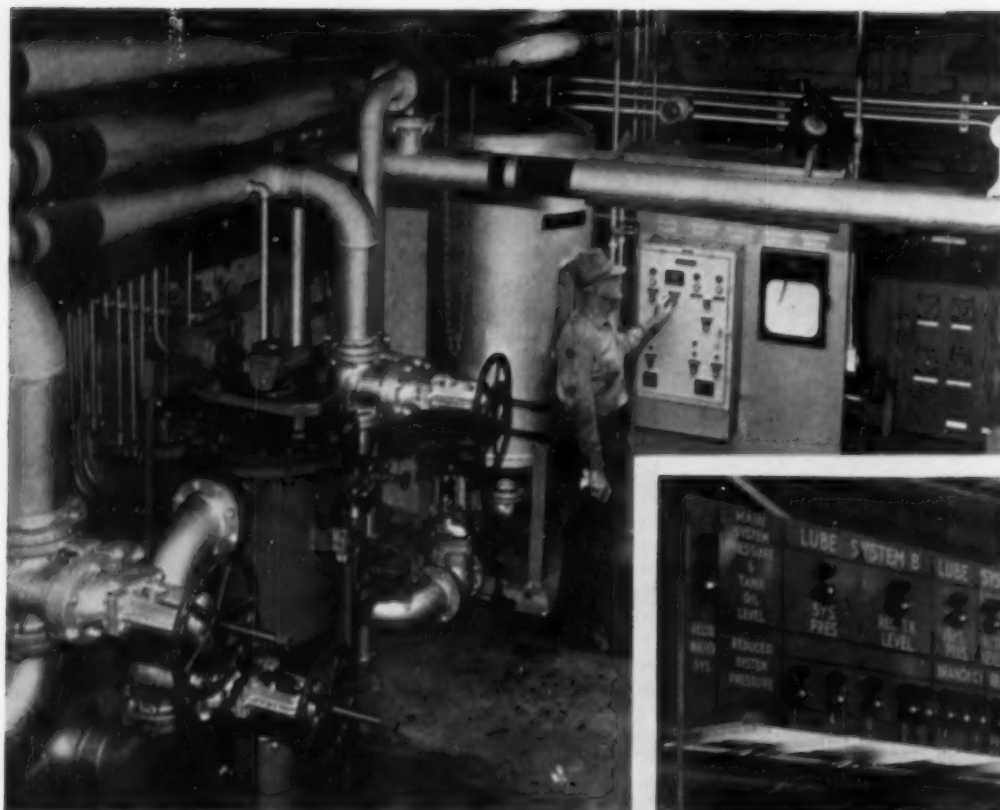
The most practical solution to the problem, therefore, appears to lie in the use of a stainless steel which is not susceptible to this type of corrosion, such as a non-austenitic grade which is capable of resisting the other types of corrosion. One of the outstanding alloys for this type of problem is Carpenter No. 7-Mo, an intermediate alloy which combines qualities of both austenitic and non-austenitic steels. In general, this type of stainless will be satisfactory from an overall corrosion resisting standpoint in those applications where Type 316 might be satisfactory, were it not for the stress corrosion cracking problem.

General Rules for the Engineer

1. Choose the proper analysis for the overall corrosion job, keeping in mind that stainless steels function as corrosion-resistant material under oxidizing conditions and that the use of these materials in a reducing environment may be inadvisable. If previous information on the resistance of a stainless steel in a particular application is not available, testing should be undertaken in the laboratory, if necessary, but preferably under actual plant operating conditions.
2. In cases where localized attack and pit-type corrosion may be expected, such as with a chloride solution, a molybdenum-containing alloy, such as Type 316, Type 317, Carpenter No. 7-Mo or Carpenter No. 20, should be specified. If processing conditions will permit the addition of inhibitors of an oxidizing nature, such as chromates or nitrates, they may also be used to minimize the pit-type attack on stainless steels.
3. Since stainless steels are subject to galvanic corrosion, it would be desirable to avoid joining stainless steel to a dissimilar metal in a corrosive electrolyte. If it is necessary to join stainless to another metal or alloy, it would be well to choose an alloy as close as possible to stainless steel in the galvanic series. It would also be well to make the junction of metal in such a way that the metals are electrically insulated

or, at least, in poor electrical contact. In any event, we should remember that if the joining of two dissimilar metals electrically is necessary, the least noble metal should present the largest area to the corrosive solution.

4. In designing stainless steel equipment, avoid crevices, sharp corners or recesses which may cause the destructive corrosion which we have called concentration-cell-corrosion. Where possible, provide good aeration and agitation of the corrosive solution in order to avoid the accumulation of deposits which might occur on metal surfaces.
5. When austenitic stainless steels are heated for an appreciable length of time in the temperature range between 800 F and 1650 F, they may become susceptible to intergranular corrosion. This intergranular corrosion may be avoided by proper heat treatment after exposure to the sensitizing temperatures, or by the use of low carbon or stabilized grades of stainless steel.
6. When austenitic stainless steels are under tensile stress in certain corrosive environments, they are subject to stress-corrosion-cracking. When this type of corrosion is likely, trouble may be avoided by using an alloy, such as Carpenter No. 7-Mo, or by relieving, in some fashion, the tensile stresses in the material.



Partial view of the main oil cellar. The control panel in the cellar contains master signals for those on the main signal board (inset photo) mounted on the wall in the mill area. An automatically and continuously cleaned constant pressure drop type filter (left) removes foreign particles from the system.

LUBRICATION Atlantic Steel Co., Atlanta, Ga.

TREMENDOUS pressures and resultant heat generation on gears and drives of Atlantic Steel Company's high speed steel rolling mill at Atlanta, Georgia, demand continuous flow of proper lubricants under close temperature and pressure controls. To meet this demand, three special-built mill lubrication systems feed approximately 475 gpm of extreme pressure oil of various viscosities to the gears and bearings. Recently placed in operation, the \$9,000,000 mill is rated as one of the fastest combination merchant bar and rod mills in the world.

Regulation of all lubrication is provided by 327 built-in orifices which assure distribution of lubricant in proper quantities to the numerous points of use and also eliminate need for external sight

feeds. 258 orifices supply oil to individual bearings and 69 supply sprays at gear mesh points.

The lubrication systems, including design of cellar and piping layouts, were supplied by Dravo Corporation, in accordance with detailed engineering specifications of Morgan Construction Company.

The smaller of the three lubrication systems supplies 22 gpm of 1,000 SSU oil at 100 F to gear drives which operate the billet cross pushers for the gas fired reheating furnace. Two larger systems supply oil to the main gear drives, pinions, and auxiliary equipment.

Tied into the two larger systems are 14 pressure reducing stations to regulate oil pressure to the various orifices. Constant pressure is so important that pressure

switches at each reducing station control signal lights and a warning horn on a large signal panel. A siren and lights also serve as alarms on the main system pressures and reservoir oil levels.

From the green lights on this signal panel, mill personnel are assured that the lubricating systems are functioning and that all machinery components are being supplied oil at the correct pressure and temperature requirements. Operating conditions of both systems are shown on control panels in the main oil cellar.

The two larger lubricating systems have been designed to provide continuous 100% filtration of the oil and to automatically maintain the required flow capacities, operating temperature, and pressure.



ZEOLITE WATER SOFTENER — manual and automatic. Up to 44% more soft water output from a softener of given size.



ULTRA-DEIONIZERS — produce highest quality mineral-free water. Replace distillation methods at fraction of distillation cost.



DEALKALIZATION & ION EXCHANGE SYSTEMS—Dealkalizers to control alkalinity. Ion Exchangers to produce water of any desired quality.



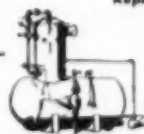
CHEMICAL TREATMENT SYSTEMS—prevents scale, corrosion and depositions with Elgin specially formulated chemicals.



CLARIFIER—for removing excess alkalinity and solids for clarification of turbid waters.



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WATER FILTERS—Diatomite, sand, anthracite, activated carbon and oil removal filters in all types and sizes.

They have placed their trust in **ELGIN!**

The listing below reads like a roster of the Great Names of American Industry . . . but actually it is simply a partial list of Elgin users!

These are firms and institutions you know well . . . firms that have won the respect of the entire business world for the thoroughness and discrimination with which they choose equipment and services.

All of them have relied upon Elgin products and skill to meet their water conditioning needs . . . often critical and demanding requirements that posed complicated engineering problems. The records plainly show that this confidence in Elgin has been fully justified.

Whatever your water conditioning needs, it will pay you — in immediate results; in long range savings — to place *your* trust in Elgin.

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Aluminum Company of America
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Campbell Soup Co.
Carnation Co.
Chemstrand Corp.
City of Denton, Texas
Commercial Solvents Corp.
Dr. Pepper Co.
Drewry's, Limited
Ford Motor Co.
General Electric Co.
General Mills
Howard Johnson Restaurants
Illinois State Hospitals
Iowa Power & Light Co.
Kraft Foods Co.

Kroger Grocery & Baking Co.
Liquid Carbonic Corp.
McDonald Aircraft Corp.
Monsanto Chemical Co.
Morrison Cafeterias
National Dairies
Neisner Brothers Inc.
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Sinclair Refining Co.
Sisters of St. Francis Hospitals
Sky Chefs, Inc.
Southwestern Public Service Co.
Stauffer Chemical Co.
Stokely Foods, Inc.
Swift & Co.
Texas Christian University
U. S. Atomic Energy Comm.
U. S. Government (Army, Navy, Air Corps)
University of Iowa
Westinghouse Electric Corp.
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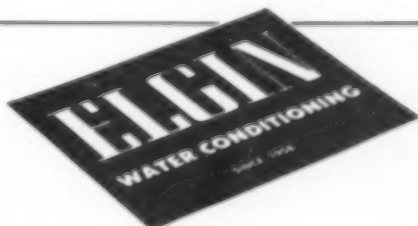
And there are hundreds more ELGIN users almost equally well known!

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Test Your Tax I Q

TEST YOUR KNOWLEDGE of the federal income tax law on this quiz prepared by the American Institute of Certified Public Accountants in cooperation with the Internal Revenue Service. You will find the correct answers at end of article.

1. During the past year you spent approximately \$1,000 for built-in bookcases and wall-to-wall carpeting for your office. Since your lease has only four years to run, you may . . .

- (a) Deduct the \$1,000 on your 1957 tax return
- (b) Amortize the cost over the next four years
- (c) Depreciate it over the life of the furnishings

2. When you were transferred to another city, your company gave you a sum of money toward the cost of moving you and your family. For tax purposes you should consider this money as . . .

- (a) A gift that is not taxable
- (b) Income that is subject to tax with a deduction for only your personal moving expenses
- (c) Income that is subject to tax with a deduction for the cost of moving your entire family

3. You have invested in several blue-chip stocks. The dividends received from this investment are exempt up to . . .

- (a) \$50 whether you or your wife owns the stock
- (b) \$100 if the stock is held jointly by you and your wife
- (c) \$100 regardless of who owns the stock, providing you file a joint return with your wife

4. You are not permitted to deduct as contributions your donations to which of the following organizations . . .

- (a) Charitable societies
- (b) Educational institutions
- (c) Political parties

5. Your daughter, who was hospitalized for several weeks in the earlier part of 1957, was married in November. If she files a joint return with her husband, you may . . .

- (a) Not claim her as a dependent but you may deduct her medical expenses
- (b) Claim her as a dependent and deduct her medical expenses
- (c) Not claim her as a dependent and you may not deduct her medical expenses

6. You filled very few inside straights during the past few months and lost approximately \$300 to the members of your Thursday night poker club. You should . . .

- (a) Deduct the loss in computing adjusted gross income
- (b) Subtract the loss from adjusted gross income
- (c) Give up poker and start watching television on Thursday nights

7. Last October your car skidded on a wet road and grazed a telephone pole. The damage was not covered by insurance and it cost you \$100 to have the car repaired. To claim a casualty deduction . . .

- (a) You must have the damage repaired within 30 days of the accident
- (b) You may simply deduct the amount of the repair bill
- (c) You must prove that you were using the car in your work at the time of the accident

8. Which of the following may you not consider as a deductible business expense . . .

- (a) A subscription to Southern Power & Industry
- (b) Commutation fees
- (c) The costs of attending the annual ASME meeting

9. While playing hide-and-seek in your backyard, the neighbor's children trampled and killed several of your more expensive bushes. The cost of replacing this shrubbery . . .

- (a) May be deducted if it does

not exceed the original cost of the bushes

- (b) May be deducted only if the parents of the children refuse to pay damages
- (c) May not be deducted under any circumstances

10. Your 16-year-old son works during the summer for you in your unincorporated business, and you pay him a weekly salary. Since he is a full-time employee, he is . . .

- (a) Required to pay social security
- (b) Not subject to social security
- (c) Permitted to decide whether he does or does not want social security coverage

11. Last year you gave your church a small piece of property for which you had paid \$500 some time ago. Its value at the time of the gift was \$1,500. As a result . . .

- (a) You may claim a tax deduction of \$1,500
- (b) You must pay a capital gains tax on the \$1,000 increase
- (c) You may claim a tax deduction of \$500

12. There were a few leaks in the shingle roof of your office building; so you constructed a new tile roof. You should . . .

- (a) Consider this as a repair bill and deduct the entire amount as a business expense on your 1957 return
- (b) Regard this as a capital improvement and depreciate the cost over a period of years
- (c) Add the cost of the repair to the value of the property

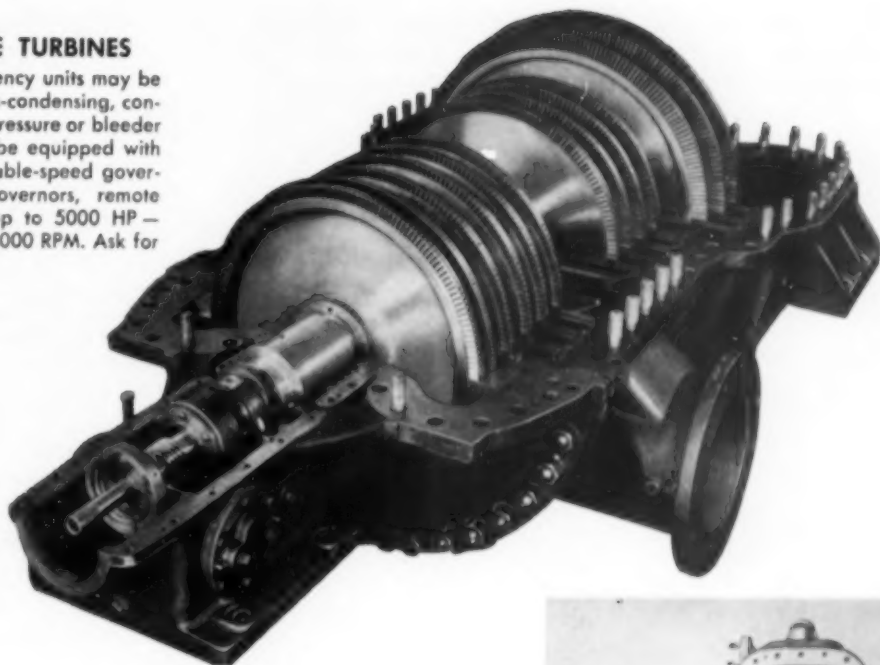
13. After you have filed your personal 1957 tax return, the Government is allowed to check your return and bill you for additional tax. The period of time in which this may be done ends . . .

- (a) On the day you file your 1958 return
- (b) Two years after you file your 1957 return
- (c) Three years from the due date of your 1957 return

14. On the advice of a friend, you engage a CPA to prepare your 1957 tax return. The fee he charges for this service is . . .

MULTI-STAGE TURBINES

These high-efficiency units may be designed for non-condensing, condensing, mixed pressure or bleeder operation. Can be equipped with constant or variable-speed governors, special governors, remote controls. Sizes up to 5000 HP — Speeds up to 10,000 RPM. Ask for Bulletin S-146.



There's a **Terry turbine** for every mechanical-drive requirement

The designs for Terry turbines are based on more than 50 years of successful experience in the manufacture of turbine drives *exclusively*. This specialization has resulted in Terry becoming one of the *leading producers* of mechanical-drive turbines in sizes up to 5,000 horsepower.

There are three basic reasons why Terry has been able to maintain this position of leadership: (1) a thorough knowledge of the requirements of mechanical-drive turbines, (2) a willingness to build "a little something extra" into each machine to assure trouble-free operation, and (3) an acknowledgement of the company's responsibility to stand behind the performance of every turbine sold.

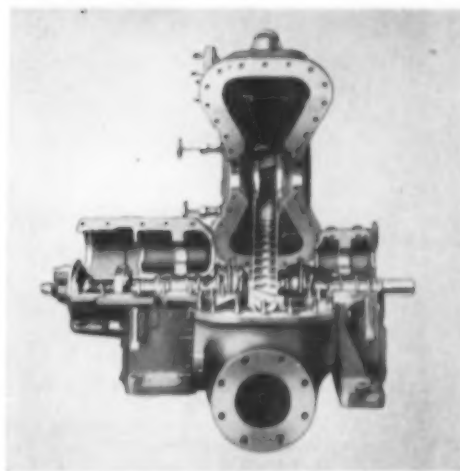
These are also the reasons why you should consider a Terry turbine for your next mechanical drive. In the meantime, send for bulletins describing any of the types of machines illustrated.

THE TERRY STEAM TURBINE COMPANY
TERRY SQUARE, HARTFORD 1, CONN.

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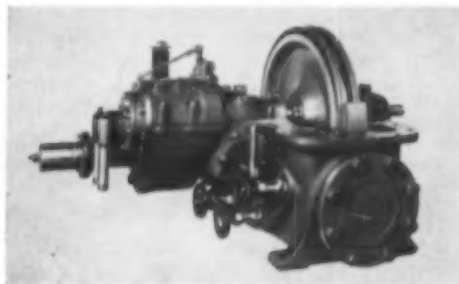
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SOUTHERN POWER & INDUSTRY for DECEMBER, 1957



SOLID-WHEEL TURBINES

Famous for sure dependability and ease of inspection. Can be started cold — no preliminary warming required. Available in vertical designs depending on frame size. Capacities from 5 to 2,000 HP. Described in Bulletin S-116.



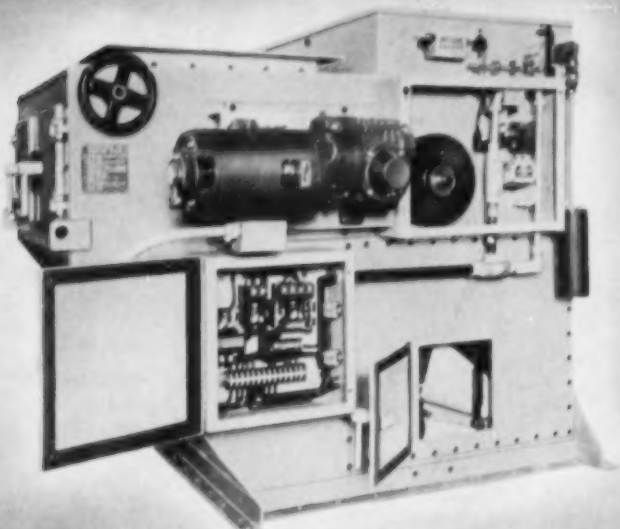
AXIAL-FLOW IMPULSE TURBINES

Built with one, two or three rows of high-grade stainless steel blading, these turbines combine efficiency with durability. Available in designs for moderate and high steam pressure. Bulletin S-143.

For more information, use Reply Card—Page 99

85

MEASURED COAL MEANS FUEL CONTROL



JAM-PROOF BELT FEEDER has brake-equipped motor, delivers exact, shallow stream of coal for uniform "break-away," insuring high accuracy. Feeder available with endless belt.

Conforms to U. S. Weights and Measures H-44 for your protection.

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AUTOMATIC COAL SCALE

Built for worry-free performance—year after year!

At coal-fired installations the world over, dependable Richardson Automatic Coal Scales are a standard method of checking boiler efficiency and fuel economy.

The H-39 is available in two sizes: a 200-pound model, with hourly capacity of 20 tons, and a 500-pound model, with an hourly capacity of 40 tons.

Consider these advantages:

- **COAL CAN'T "ARCH"** in feeder or weighing hopper. All Richardson H-39 models have extra-large (24"x24") inlets for free movement under all conditions.
- **NO DUST PROBLEMS**—all parts positively dust-sealed. All electrical equipment is totally enclosed, mounted outside dustproof housing.
- **MINIMIZED CONDENSATION PROBLEM**—exhaust vents at each end for natural or forced air circulation.
- **EASY ACCESS** through doors mounted in removable plates.
- **RUGGED, DURABLE CONSTRUCTION** means lasting accuracy. Extra heavy steel frames, corrosion-resistant stainless plating.

For detailed information, write for Bulletin 0352-A.

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

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Sales and Service Branches in Principal Cities

Ⓜ 4470

- (a) Not deductible since it is a personal expense
- (b) Not deductible if you are entitled to a refund
- (c) Deductible in full

CORRECT ANSWERS

1. (b) On leased property, you normally spread the cost of improvements over the shorter period—the life of the improvement or the term of the lease. Since your lease expires in four years and presumably the furnishings will have a longer life than that, you should be able to claim a \$250 deduction on your federal tax return for this year and the next three years.

2. (c) The money you received from the company must be reported as income, but you may deduct the cost of moving your entire family. If the amount the company gives you exceeds your expenses, the excess is taxable. Conversely, however, if your expenses were more than the amount received, the difference is not deductible.

3. (a) and (b) are both correct. All taxpayers are entitled to a \$50 dividend exemption. A husband and wife can combine their exemptions and receive \$100 in dividends tax free, providing the stock is jointly owned. The filing of a joint return will not qualify them for this double exemption if the stock is held in only one of their names.

4. (c) You cannot deduct contributions to an organization which spends a substantial part of its time lobbying or distributing political propaganda.

5. (a) You gained a son-in-law but lost a \$600 dependency exemption for 1957 when your daughter married in November. All is not lost, however. If you provided more than one-half of your daughter's support during the year, you may claim her medical expenses as a deduction on your return.

6. (c) Watching television can be most relaxing and it might even help you to forget your poker losses—which is the thing to do because net gambling losses are definitely not deductible. Net gambling gains are taxable as income; so if you won money in a football pool or other sources, you may use your poker losses to offset these gains.

7. (b) The IRS has ruled that "if

IT'S NEW! Coal—custom blended to your exact requirements



2 different coals



become 1

World's Finest Coal Blending Plant Makes this Possible

Now, rather than get coal of the approximate quality you require, you can get coal of exact specifications.

Garland Coal Company's new custom blending plant in Virginia makes this possible for you. The plant is located on the Norfolk and Western Railroad and has 6 loading tracks. The coal can be loaded in any size required and 6 grades may be prepared simultaneously.

Different coals are stored in individual hoppers. A large conveyor belt passes beneath. The engineer then releases varying amounts of coal from each hopper to custom blend a mixture of coals. You get exactly the high, medium or low volatile coal you want with the exact ash, sulphur, coke index, grindability and BTU content.

Contact Garland Coal Company today and find out how Garland's new custom Blending Plant can give you more efficiency from coal, thus saving you money.



Coal is a Better Buy Than Ever. Coal actually costs 1.2% less than it did in 1946 while the price of competitive fuels has risen substantially. Enormous reserves of coal in this country insure a constant supply of relatively low cost fuel. Coal is still your best buy.



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I would like more information on Custom Blending of Coal.

Name

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Company Position



ANNOUNCING
Goulds NEW
vertical centrifugal
pump custom-built
from
standard parts



Here's a new way to hold costs down and still get a sump or process transfer pump that meets your exact requirements.

When you buy a Goulds Fig. 3171 pump, there's nothing extra to pay for custom-building. This new heavy-duty pump is assembled from standard parts.

In addition, you'll get delivery in the same time it takes to get a "stock" pump.

Just look at these other advantages you get with this new pump:

- Pump assembly including cover plate is a complete unit.
- Internal impeller adjustments are easily made from the outside.
- Upper bearings are readily replaced without disturbing the pump or piping. Just remove motor and coupling.

- All units are furnished with Falk all-steel bearings.
- Units may be adapted in the field to meet changes in pit depth or pump ratings by simply replacing the necessary parts.

You can get wet pit type or dry pit type in either single or duplex units. Vaporproof construction, if you want it.

Special shafts and pipe columns aren't needed. Units come in standard lengths from 2 to 20 feet in 6-inch increments.

Choose from 11 motor sizes with capacities to 1080 GPM or heads to 290 feet. Get the complete story on this new Goulds pump by writing for Bulletin 726.2.

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Tax Quiz Answers

Questions — Page 84

the repairs do nothing more than restore the property to its condition immediately before the casualty and do not add to (its) value, utility or useful life, such repair costs may be used as a measure of the value of the destroyed portion." Where you were going at the time of the accident does not affect the deductibility of car damages.

8. (b) Commutation fees are not a deductible business expense. The cost of going to and returning from work, whether it be by bus, cab, train or plane, is not deductible since it is a personal expense. On the other hand, a and c are deductible.

9. (c) Damage to your shrubbery caused by children, dogs or errant lawnmowers is not deductible. If your home or lawn is damaged by fire, storm or flood the loss not covered by insurance may be deducted. When large amounts are involved it is wise to have an expert appraisal made immediately after the casualty.

10. (b) Since your son works for you, you are not supposed to pay social security tax on his wages, nor is he required to make contributions. If your business is incorporated, however, the corporation must pay social security tax on his salary.

11. (a) Your deduction for a charitable contribution is the value of the gift at the time it is made. You are not considered to have realized a taxable gain or deductible loss when you give property away. You may claim a deduction for the entire \$1,500 so long as this amount does not exceed 20 per cent (30 per cent in some cases) of your adjusted gross income.

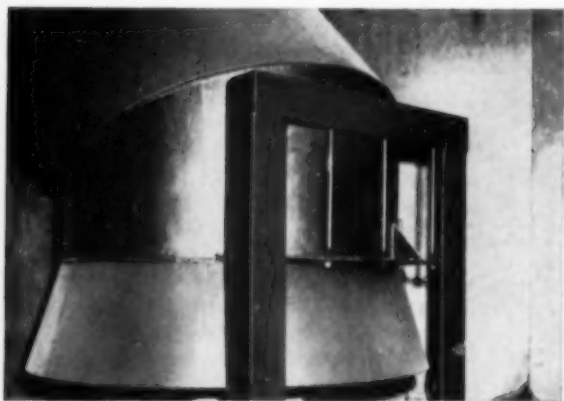
12. (b) The roof is considered an improvement, not an ordinary repair. The cost of replacing the roof is deductible as depreciation spread over its estimated useful life.

13. (c) In the absence of fraud or substantial understatement of income, the Government has three years from the due date of your 1957 return to check your return and bill you for additional tax. Since the due date of most individual returns is April 15 and for investigation purposes all returns are treated as though filed on the due date, you should be sure to save all check stubs and receipted bills



Welder applies the finishing touch to a section of corrosion resistant wrought iron duct slated for shipment to the Orlando Utilities Commission's municipal power plant.

Wrought Iron provides rugged opposition to corrosion in Orlando, Florida's municipal power plant



This wrought iron surge well outlet presents a formidable defense against corrosion and fatigue stresses at the Orlando powerhouse.

Three hundred sixty tons of durable wrought iron help minimize the threat of corrosion at the Orlando Utilities Commission's municipal power plant.

Here, ducts, tanks, pipe and stack installations of wrought iron are successfully withstanding corrosion. Result is low-cost corrosion control . . . virtually no maintenance or repairs. This material actually pays for itself in years of service rendered.

Reasons why wrought iron brings such permanence to plant facilities appear in our booklet, *The ABC's of Wrought Iron*. Write for your copy. A. M. Byers Company, Clark Building, Pittsburgh 22, Pennsylvania.

Available in Canada and throughout the world

Architects and Engineers: Robert & Co., Associates, Atlanta, Georgia

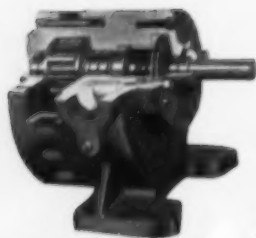
Fabricators: Brock & Blevins & Co., Inc., Rossville, Georgia

J. J. Finnigan Co., Inc., Atlanta, Georgia

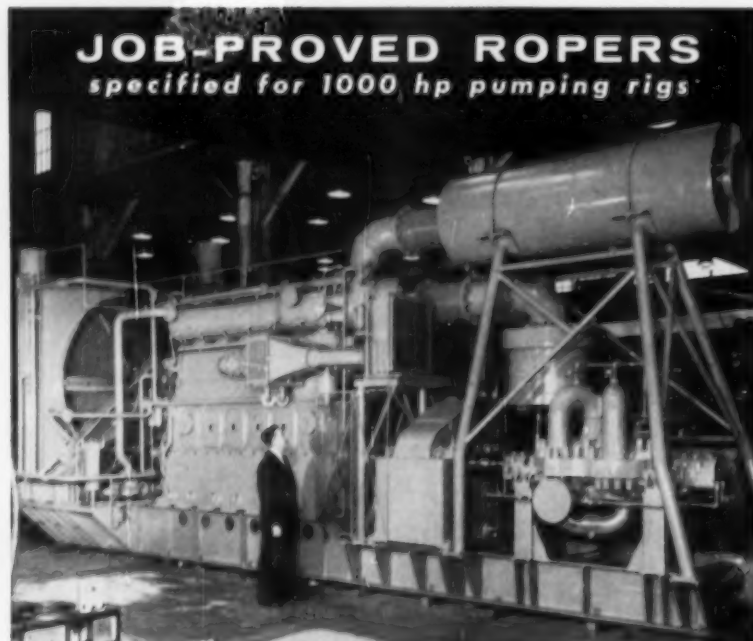
Snyder Tank Co., Birmingham, Alabama

BYERS Wrought Iron Tubular and Hot Rolled Products

ALSO ELECTRIC FURNACE QUALITY STEEL PRODUCTS



*"Selected for Dependability
and Durability Necessary
in Desolate Persian Gulf Outpost"*



● The Enterprise Model DSG-36 pumping unit shown above is one of four built for the pipeline pumping system in the Wafra oil fields north of Saudi Arabia.

To meet specifications, Enterprise, a division of General Metals Corporation, designed lube oil, fuel oil, air intake intercooling, and crude fuel heating systems which all fit into compact and completely portable units that withstand not only long hours of service, but the ever-changing weather conditions of desert operation.

An interesting feature is the economical fuel arrangement which permits the engine to burn the crude oil it is pumping, a system which has resulted in fuel savings as high as 90%. This is where Roper fits in. A Series H pump, selected for dependability and durability, is the heart of the fuel heating system, delivering 3 GPM of 220 SSU crude oil at 100° F. at pressures of 800 lbs.

Again, it's a case of job-proved Ropers meeting specifications and providing optimum efficiency. Roper can give you excellent results, too! *Send for catalog today!*

Series H Features

● Sizes 3 to 75 GPM . . . pressures to 1000 PSI

● Splined drive—drive shaft separate from drive gear absorbs thrust loads.

● Roller bearings and bronze wear plates, two on each side, reduce friction. Journal and bearing continuously lubricated by liquid pumped.

● Spur gears provide highest volumetric efficiency, and operate in axial hydraulic balance.

● One-piece backplate gasket-sealed against leakage, carries pipe connections, permits removal of internal parts without disturbing piping or drive.

ROPER HYDRAULICS, INC.

formerly
Geo. D. Roper Corporation, Pump Division
442 Blackhawk Park Ave.
Rockford, Illinois

ROPER
Rotary Pumps

to prove your declared deductions until April 15, 1961.

14. (c) The fee which a CPA charges you to prepare a tax return or defend the accuracy of your return before the Treasury Department is deductible in full if you itemize deductions.

Mill Scale Removed from Oil Systems

ANY MILL scale allowed to remain in the hydraulic piping of new compressor lubrication and seal oil systems may flake off and be carried to bearing surfaces where it will cause serious damage.

A southern chemical plant prevented these losses when placing four new compressors in service recently by having Dowell Incorporated remove mill scale from the oil systems, using chemical solvents.

The units were first connected in series with a pump truck so that chemicals could be circulated through them. The entire system was then hydrostatically tested to eliminate leaks.

An alkaline detergent heated to 170 F was circulated to remove paint and organic materials. Then the detergent was drained, and fresh water was flushed through the system.

Hot, inhibited hydrochloric acid (160 F) was circulated for several hours, after which the acid was displaced by nitrogen. The system was again flushed with water.

This water flush was followed by a neutralizing solution, which was circulated through the system for an hour. A passivating solution (to make the metal surfaces rust-resistant) was added and circulated. The system was then drained and hot flush oil (160 F) was circulated to remove any remaining water.

Upon completion of the work, chemical plant personnel inspected the lubrication and seal oil systems on the four compressors and found that all mill scale deposits had been removed.

End these steam trapping problems!

1. High maintenance cost

2. Too many sizes and pressure ratings

3. Steam blowing on light load

4. Limited installation space

5. Pressure variations

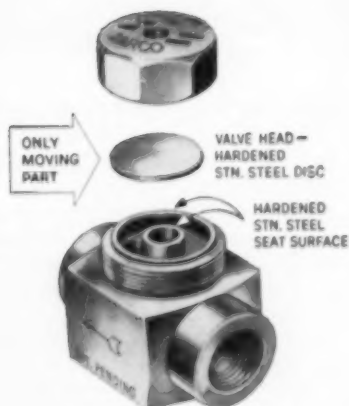
6. Corrosion

7. Air binding

8. Freezing

HERE'S HOW...

with the versatile Sarco TD Thermodynamic Steam Trap



ONLY 3 PARTS SIMPLE—TROUBLE-FREE

All parts machined from stainless steel bar stock. Only moving part—a solid hardened stainless steel disc—practically wear-proof.

No mechanism—the kinetic energy of steam closes the valve. No narrow channels to choke. No gaskets to leak.

1. **Practically eliminates maintenance**—as shown, left, the TD has only 3 simple, rugged parts—all stainless steel. No mechanism . . . to wear or malfunction. Highly resistant to superheat, water-hammer, corrosive condensate.

2. **One trap for all pressures**—10 to 600 psi—for light or heavy loads. Self-adjusting—each size Sarco TD uses same large capacity seat for all pressures—without change or adjustment.

3. **Won't blow steam on light loads**—no prime to lose—no adjustments.

4. **Small as a tee fitting**— $\frac{1}{2}$ " size, for

example, only $2\frac{1}{4}$ " long, $1\frac{1}{4}$ " wide, $2\frac{1}{4}$ " high.

5. **Operates perfectly when pressure fluctuates**—absolutely no effect from 600 to 10 psi! No water seal to evaporate. No adjustments.

6. **Unaffected by corrosive condensate**—made of stainless steel throughout.

7. **No air-binding**—discharges at steam temperature and vents air and air-steam mixtures at start-up and during operation.

8. **Freeze-proof**—self-draining when installed with outlet down.

60-DAY TRIAL CONVINCES

We will gladly send you a Sarco TD steam trap and strainer for 60-day trial. No cost or obligation. You buy only if completely satisfied. Advise size— $\frac{1}{4}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ " or 1"—and application. Sarco Company, Inc., 635 Madison Ave., New York 22, N.Y.

2217-B

SARCO **Thermo-Dynamic** **STEAM TRAP**
TRADE MARK

THE MODERN STEAM TRAP—THAT CAN DO MORE THINGS BETTER!

the answer to

WARPING EMBRITTLEMENT DISTORTION

Welding the ordinary fusion way, with its required high heats, can cause extreme expansion of the base metal. After cooling, chances are the metal will not return to its original shape... or strength.

With Eutectic's exclusive "Low Temperature Welding Alloys" and "Low Heat Input" method, high heats are no longer necessary for good welds. Using this revolutionary welding method a *surface alloy* is produced from the base metal and filler metal. This strong, tough bond is a result of the *diffusion* of the atoms of the base metal into the liquid "Low Temperature Alloy." With "Low Heat Input" the base metal need never be brought to fusion temperature... avoiding high heat distortion, warping and embrittlement.

YOU CAN BENEFIT with EUTECTIC'S TECHNICAL INFORMATION DIGESTS

Write "Eutectic" today for your free copies

AUTOMOTIVE WELDING ISSUE (TIS 2822)

Latest welding techniques to do better repair jobs on your automotive equipment. Everything from body work to motor blocks.

TOOL & DIE ISSUE (TIS 2831)

Costly tools can be fabricated inexpensively in any shop with welding. Expensive dies, whether cast iron, cast steel or kirk-site can be repaired quickly. This manual tells how.

CONSTRUCTION MAINTENANCE WELDING ISSUE (TIS 2832)

Keeping equipment moving is essential to any builder. Learn new techniques that assure longest, most efficient service life from construction machinery and tools.

FARM MAINTENANCE WELDING ISSUE (TIS 2837)

Farmers, dairymen, ranchers, all will learn the latest "Eutectic" developed weld savings methods that give years more service from costly agricultural equipment.



Plant, Research Laboratory and World Headquarters

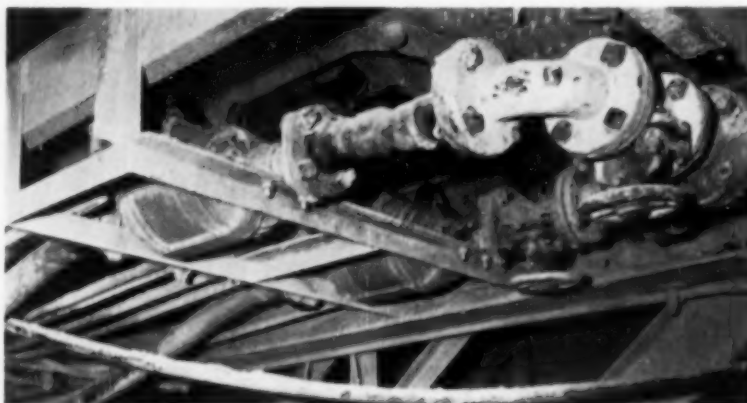
®Registered Trade Mark of:

EUTECTIC WELDING ALLOYS CORP.
40-40 172nd Street, Flushing 68, New York, N.Y.

HEATING PLANTS — Guide Specifications for Typical Low-Pressure Commercial Plants

Bituminous Coal Institute's first Guide Specifications written for a typical low-pressure commercial heating plant consisting of two 500 lb/hr screw-type underfeed stokers has been recently published. The 53-page manual is to be a guide for consulting engineers and architects and others, in the writing of specifications for coal-fired heating plants. Specifications are written specifically for a design heating load of 20,000 EDR or 4.8 million Btu/hr. By adjusting boiler, stoker and bin size up or down, the basic recommendations on layout and type of equipment can be used for most heating plants of a load range of 3,000 to 24,000 EDR or about $\frac{1}{4}$ to $5\frac{1}{2}$ million Btu/hr.

Recommendations have been made to achieve clean, efficient and low cost plant operation consistent with low initial cost. All items affected by the fuel selected are described in detail, but all other items required for a complete heating plant have been listed in the Specification Index. For your free copy write: Bituminous Coal Institute, Southern Bldg., 15th & H Sts., N.W., Washington 5, D. C.; and ask for "Guide Specifications"—AIA No. 30-A.



Phosphate Slurry Accurately Measured

TO GET uniform pre-mixing and quality control, Swift & Company needed a trouble-free way to measure the flow of phosphoric acid slurry in their Agricola plant-food operations near Bartow, Florida.

Conventional flow meters use a restriction in the flow line which caused the slurry to set up and harden. Orifice plates eroded; pressure taps fouled; even water-purged Venturi tubes could not give accurate measurement in such severe service.

The problem was solved by installing Magnetic Flow Meters in

the pre-mixing stage of the phosphoric acid process. Manufactured by The Foxboro Company, the instrument is electromagnetic in principle. Two electrodes sense the voltage produced by liquid flowing through a magnetic field. The voltage, proportional to flow, is recorded directly on a linear scale chart of a Dynalog (electronic) Recorder.

The meter requires no line restriction; electrodes are mounted flush with the inner surface of a straight-through section of stainless steel tube, the same diameter as the flow line; therefore — no erosion or fouling. The tube is protected by a durable plastic liner.

In well over a year of operation, the two instruments have

EUTECTIC



PLANT, RESEARCH LABORATORIES
and WORLD HEADQUARTERS



Published by EUTECTIC WELDING ALLOYS CORPORATION 40-40 172nd STREET, FLUSHING 58, NEW YORK, N. Y.

CRACKED MOTOR BLOCKS NOW WELDED IN PLACE WITH "LOW AMP" XYRON 2-25

To overcome the difficulties of welding motor block cracks due to freeze or accident, "Eutectic" developed patented Xyron 2-25 (AC-DC), the all-position 'Frigid Arc' coated electrode for cast iron.



Use of all-position Xyron 2-25 (AC-DC) on cracked engine blocks eliminates the need for dismantling and extensive cleaning. Weld may be performed in position.

Xyron 2-25 (AC-DC) meets every requirement for use on cracked engine blocks. Machinable dense deposits can generally be made without preheating the oil soaked cast iron. Weld metal is free flowing and has exceptional affinity for cast iron. This is extremely advantageous when long or large deposits must be made...as it minimizes the possibility of cracking or slag inclusion. The lower amperage permitted with all Eutectic "Low Temperature Welding Alloys" eliminates distortion, embrittlement, warpage and danger of fusion.



The result: a dense, smooth, crack free, machinable deposit without the necessity of preheating.

Because of its many specialized features, and because of its strength, (ultimate tensile strength of 56,000 psi), thousands of welders find it necessary to reach for Xyron 2-25 (AC-DC) when the job is a cracked engine block, transmissions, gear housing, cams, levers, machine bases and similar cast iron parts.

"LOW HEAT" OVERLAY SOLVES ABRASION PROBLEM

Rough, tough wear and abrasion weakened and finally snapped off flanges on this high-alloyed steel sand and gravel conveyor screw (figure 1). Abrasion also



(Fig. 1)

caused pitting and galling. This meant serious maintenance and downtime expenses to management—a West Virginia Mill.

Eutectic's local District Engineer was consulted, and suggested rebuilding the screw with EutecBor #9.

EutecBor #9 is a super-high alloy overlay specifically formulated for use where

severe abrasion is a problem. It is non-magnetic in nature and has a hardness as deposited of RC 55-62. EutecBor #9 is also extremely resistant to corrosion and has the added advantage of minimizing weld weakening dilution of the base metal. Deposits of this widely useful alloy accept a high polish and resist pitting and galling (figure 2).

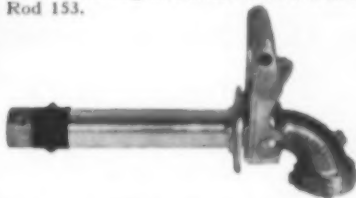
Management now reports conveyor shaft stays in operation much longer without maintenance—effects a considerable savings in downtime and repair costs.



(Fig. 2)

ALUMINUM TO STEEL JOINT "INDESTRUCTIBLE"

An Iowa manufacturer of oil equipment wanted a lighter, stronger fill tube. A steel tube encased in an aluminum tube (except for the very tip) was to be welded to the valve apparatus, a casting of Almag 35 Aluminum. The manufacturer's Chief Research Engineer was told such a weld was impossible. His local "Eutectic" District Engineer recommended testing a procedure utilizing EutecRod 19 and EutecRod 153.



The valve casting was machined to permit a one-inch insertion of the steel tube.

Joining would be done with EutecRod 19—a self-fluxing, low-melting, solder-type alloy.

EutecRod 153 was chosen to "tin" the steel tube; it has a high affinity to EutecRod 19.

The tubes were cleaned and dipped in the molten EutecRod 153. The high remelt then enabled the insertion of the tube in the Almag casting, and the flow of EutecRod 19 through the joint without burning or reaching the oxidation point of the "tinned" surface on the steel tube. Subsequent destruction tests showed that the Almag casting was completely destroyed, or the steel tube was bent so badly that the part would have been unusable, and yet there was no rupture of the joint area.

SEASON'S GREETINGS

With this issue, we come to the conclusion of the first year of publishing Eutectic Welding News. We trust the articles contained on these pages have proven to be of value. We will strive to continue presenting new cost and time saving ways of using "Low Temperature Welding Alloys."

As 1958 quickly approaches we wish to take this opportunity of extending to you Season's Greetings, and Best Wishes for a Happy and Prosperous New Year.



Eutectic Warehouse—Service Centers
446 Northside Drive, N. W., Atlanta 18, Ga.
2204 Irving Boulevard, Dallas 7, Texas

EUTECTIC WAREHOUSE—SERVICE CENTER • 446 NORTHSIDE DRIVE, N.W., ATLANTA 18, GA.
EUTECTIC WAREHOUSE—SERVICE CENTER • 2204 IRVING BOULEVARD, DALLAS 7, TEXAS

"EUTECTIC" WELDING HEADLINES • TIME-MONEY-MACHINERY SAVERS

A NEW WARREN Centrifugal



Type 1CH 2-stage pump

is designed and priced
for low-capacity, high head jobs

Here is another cost-saving addition to the Warren line of Compacunit Close Coupled Pumps.

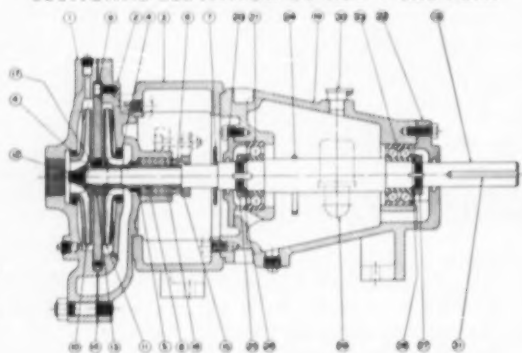
Capacities - 5 to 60 gpm
Heads - 200 to 375 ft.

The new Warren 1CH is important too for its simplicity and compactness... and every part is designed for long life and protection against wear. It is also available with a cradle mount (Type 1CHC).

SECTIONAL ELEVATION OF NEW 1CHC PUMP

DESIGNATIONS

1. Casing—1st Stage
2. Casing—2nd Stage
3. Frame
4. Case Ring
5. Stuffing Box Bushing
6. Gland
7. Flinger
8. Shaft Sleeve
9. Center Section
10. Impeller—1st Stage
11. Impeller—2nd Stage
12. Impeller Nut
13. Center Section Bushing
14. Gasket
15. Gasket
16. Packing Anchor No. 317
17. Impeller Key
18. Shaft



RATING CHART

1-CH or 1-CHC Bulletin

HD	GPM	5	10	15	20	30	40	50	60
275	7½	7½	7½	7½	7½	7½	10	10	
300	7½	7½	7½	7½	7½	7½	10	10	
325	7½	7½	7½	7½	7½	10	10		
350	7½	7½	7½	7½	10	10			
375	7½	7½	7½	7½	10				

AVAILABLE IN THESE MATERIALS

PART	STANDARD	ALL IRON	ALL BRONZE
Suction Head	Cast Iron	Cast Iron	Bronze
Casing	Cast Iron	Cast Iron	Bronze
Impeller	Bronze	Cast Iron	Bronze
Impeller Nut	Bronze	Stainless Steel	Bronze
*Shaft	Steel	Steel	Steel
*Shaft Sleeve	Bronze	Cast Iron	Bronze
Seal Cage	Cast Iron	Cast Iron	Bronze
Gland	Cast Iron	Cast Iron	Bronze
Flinger	Cast Iron	Cast Iron	Cast Iron
Frame	Cast Iron	Cast Iron	Cast Iron

*Shaft sleeves available in Nitralloy Nitride, Hardened Stainless steel or Monel and shafts in Stainless Steel or Monel on special order.

ASK FOR BULLETIN NO. 342



WARREN PUMPS, INC.
WARREN, MASSACHUSETTS

G-7

required no more than routine maintenance. With accurate, dependable flow records, operators can now maintain a uniform feed of H_3PO_4 to the reactor tanks, permitting greatly improved quality control throughout the process.

Gannon Station

(Starts Page 44)

Gannon control room, the system dispatching center, and the control house at the normally unattended Gannon 138 kv substation.

The recorded cost of installing Unit No. 1 at Gannon Station, including indirect costs, amounts to \$112 per kw of gross capability at January 1, 1957 price levels. A breakdown of this recorded cost is given in the table. These costs cover structures, boiler plant equipment, turbine generator, accessory electric equipment, miscellaneous power plant equipment and substation, insofar as they are chargeable to Unit No. 1. The purchase price of the site area and the cost of dredging to produce land from water are not included.

Since Unit No. 1 is the initial installation at a new site, some of equipment installed with it, such as coal and ash handling, turbine room crane, water demineralizing and chlorination equipment, will serve future units. By careful examination of each item, the applicable portions of these costs have been included in the recorded cost of installing Unit No. 1.

Further, in this station, as in many others, certain optional general service facilities, such as administration building, city water pump house, garage, machine shop and laboratory have been installed which are not always required in generating station developments, either with the first unit or subsequent ones. These costs have been excluded in developing the \$112 figure. Had they been added on a pro-rata basis they would have raised the construction cost of Unit No. 1 to \$115.20.



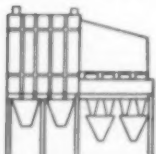
**Pay dirt!
...year after year!**



**BUELL
CYCLONE**



**"SF" ELECTRIC
PRECIPITATOR**



**PRECIPITATOR-CYCLONE
COMBINATION**

Buell Cyclone collectors pay off two ways: extra efficiency from the start . . . and extra years of operation, with little if any maintenance. Unique features like Buell's exclusive Shave-off deliver an extra percentage of dust collection efficiency: in nearly all cases, Buell installations pay for themselves in just a few years. And heavy plate construction, scientific proportioning, side entry of dust-laden gases are reasons why

they keep on earning for many, many years. For specific details, write for "The Collection and Recovery of Industrial Dusts". Just write Dept. 80-L, Buell Engineering Company, Inc., 123 William Street, New York 38, New York.



buell

Experts at delivering Extra Efficiency in **DUST COLLECTION SYSTEMS**



VERSATILE sheet packing for wide range of service

Many engineers call Belmont's compressed asbestos sheet packings for dry and saturated steam, air, gas, oil, solvents, ammonia and most chemicals—"the handiest sheet packings in the plant."

Various compositions and special binders, all thicknesses $\frac{1}{4}$ " to $\frac{3}{16}$ ", sheet sizes to 150" x 150", or supplied as cut gaskets to specifications, for practically all maintenance requirements.

The Belmont Packing and Rubber Co.
Butler & Sepviva Sts., Phila. 37, Pa.

• Ask your Belmont Distributor for his recommendations.

Such leading Packing Distributors as:
Union Gasket & Packing Co., in Denver, Colorado
and
Warren & Bailey in Los Angeles, California
are ready to serve you promptly and helpfully,
wherever you are.

BELMONT

Grid System Pinpoints Stored Materials

THE PROBLEM was to locate the hiding place of that stored material someone had remembered was sent to the storage yard. Many man-hours were being wasted in hunting through the jungle of stored material for that one piece being sought.

In seeking a simple but effective system for solving this problem, the use of a grid system seemed to be the answer.

The storage area is divided into approximately twenty foot squares with the squares being identified by a combination of numbers and letters. The North-South coordinates are numbered consecutively from one on up. The East-West coordinate are lettered A, B, C, etc., using AA, BB, etc., as needed.

Duplicate 3 x 5 identification cards are made for each item when it comes in for storage. These cards contain such information as date of entry, description, previous location, authority placing in storage, and grid location in storage yard. There are also blanks for "Removal From Storage" information. One of these cards is placed in a transparent weather-proof envelope and attached to the material. The other copy is placed in a card file. This file is divided into convenient categories to suit the needs of the storage and for convenience in locating the file reference.

Upon removal of the material from storage, the card attached to the material is removed and the removal information showing the disposition of the material is entered on the card. This card and the one in the card file are transferred to a "dead" file which then becomes a historical record of movement of the material. Actually this "dead" file is as active as the so-called active file.

This is not a new system by any means, but too few people use any system at all. This one works.

By M. H. VAN MANEN, Union Carbide Chemicals Company, Texas City, Texas.

Keep boilers on the line with
WILSON
Maintenance Tools

Heavy-duty air driven tube cleaners



Designed to deliver maximum power at the most efficient cutter head speeds while negotiating sharp bends, the Model ECT Air Cleaners are excellent for cleaning curved boiler tubes from 2½" to 4½" O.D.

Self-feeding tube expanders



Wilson Model 38 tube expanders are self-feeding and parallel expanding. They are of the single flare roll type. Available for tubes 1" O.D. to 4½" O.D. with various roll lengths for tube seats ¼" and up.

Model E Expanders



Flaring type expander 1" O.D. to 4½" O.D. tubes, ½" to 2" tube seats

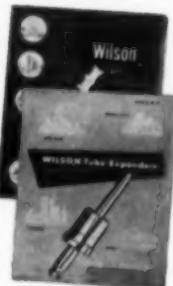
Long reach type expander 1" O.D. to 4½" O.D. tubes, 2½" to 5" tube seats

Right angle bevel gear drive



This Wilson bevel gear drive is expressly manufactured to meet continuous and heavy duty service conditions. The one piece all steel body is extremely rigid and not subject to distortion. The maintenance of perfect gear alignment is assured with consequent long service life.

Write today for your copies of Wilson Tube Cleaner catalog No. 77 and Wilson Tube Expander catalog No. 88.



Representatives in principal cities
Thomas C. Wilson, Inc. • 21-11 44th Ave., Long Island City 1, N. Y.
 Cable address: "Tubeclean", New York

WILSON

TUBE CLEANERS • TUBE EXPANDERS

SOUTHERN POWER & INDUSTRY for DECEMBER, 1957



Westmoreland Coal Company



Stonega Coke and Coal Company



**Kentucky Sun Coal Company -
 Old King Mining Company
 No. 1 & No. 2**

**ASHLO SUNFIRE OLD KING HARDBURLY
 Brown Fuel Company
 HENSHAW**

**PREMIUM ANTHRACITE
 Product of Jeddo-Highland Coal Company
 Hazle Brook**

Genco Anthracites & Bituminous Coals

General Coal Company

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For more information, use Reply Card—Page 99

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NEW Catalogs & Bulletins

STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

1—Package Boiler — New compact, low cost package unit (oil or gas fired) for small space requirements is described in Bulletin DK-1. Pressures to 325 psi, steam capacities to 45,000 lb/hr.—E. KEELER CO.

8—Steam-Turbine Units — Medium condensing turbines utilizing either non-reheat or reheat; noncondensing turbines; single, double and triple automatic extraction turbines; admission units; and admission-extraction steam turbines for utilities and process industries described in Bulletin GE-327D. — GENERAL ELECTRIC.

10—Stokers — Application & operation of A.E. Types "H" & "R" and Vibra-Grate stokers described in latest bulletins. Latter burns low grade fuels without smoke. No dust collectors necessary. — AMERICAN ENGINEERING CO.

11—Feedwater Treatment — Bulletin describes liquid and dry (Braxton & Flako) boiler feedwater treatment recommended for removal and prevention of scaling and corrosion during use of many types of water and for prevention of foaming and carryover. — ANDERSON CHEMICAL CO.

14—Generator Installations — Bulletin GB-1 shows how installations of Amesteam Generators have solved boiler room problems for their owners. Photos illustrate units from 10 through 600 hp for firing combinations of oils and gases. — AMES IRON WORKS, INC.

16—Small Boiler Performance—AS Brochure shows how the packaged Ljungstrom air preheater boosts performance. Boilers as small as 25,000 lb/hr can have advantages of regenerative preheating—saves fuel, boosts output, and permits use of lower grade fuels.—THE AIR PREHEATER CORPORATION.

61—Ash Removal—Bulletins S-57 & S-57A show how costs can be reduced with pneumatic and hydraulic ash conveyors. High operating efficiency based on tons of ash

handled per pound of steam used.—NATIONAL CONVEYORS CO., INC.

80—Hot Water Boilers — 20 page brochure describes and illustrates the design, construction, advantages and economies of the La Mont controlled circulation hot water boiler for supplying high pressure, high temperature water for heating systems and process applications. — COMBUSTION ENGINEERING, INC.

88—Industrial Burners — General Bulletin 757, 16 pages — Describes and illustrates industrial oil burners, gas burners, combination gas and oil burners for boilers, dryers, stills, retorts, kilns, etc., and fuel oil pumping and heating units which go therewith. — NATIONAL AIROIL BURNER CO.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

122—Industrial Fans—Bulletin 702A covers type XL Fans having 11" thru 60" inlet diameters, pressures to 18" SP, volumes to 130,000 CFM for industrial air and material handling.—CLARAGE FAN CO.

123—Slurry Pump — Catalog describes the new SP-90 slurry pump which permits proportion of slurries in the mix tank to remain constant, with pumping rates variable from maximum to 1/5 of maximum.—MANZEL.

142—Centrifugal Pumps — Full line of single stage horizontally split case centrifugal pumps described in 12 page Bulletin 721.6; capacities 200-6400 gpm; heads up to 260 ft; maximum standardization and interchangeability of parts. — GOULDS PUMPS, INC.

143—Chemical Feeders — 36 p Bul. 1136 describes metering pumps — types, construction, displacement and operating pressures. Gives handling recommendations for chemicals, acids, etc., and volumetric conversion tables.—MANZEL.

144—Fluid Drives — Catalog, 24 pages — Describes and illustrates Type VS Class 4 Gyrol fluid

drives. Eight sizes are listed, with speeds to 1800 rpm and 100 to 2500 hp. — AMERICAN BLOWER CORPORATION.

156—Pumps & Pump-Motors — 12 p Catalog 957 illustrates and describes company's rotary pumps and hydraulic pump-motors. Specification charts also included. — GEO. D. ROPER CORP.

170—Heat Exchangers — Bulletins 120 & 124 describe Aero units which cool liquids & gases by evaporative cooling with atmospheric air, removing heat at rate of input, and precisely controlling temperature. Solves problems of water availability, quality or temperature. — NIAGARA BLOWER CO.

177—Hand Pumps — Bulletins 320 and 350 describe and illustrate hand pumps used for transferring liquids from drums, vats, tanks, underground storage tanks, etc. — BLACKMER PUMP COMPANY.

182—General Service Pumps—Catalog E-100 describes Type EUG units for draining boiler pits, scale and elevator pits and other areas requiring removal of solid-free drainage and seepage from low to high levels.—Economy Pump Div. of C. H. WHEELER MFG. CO.

INSTRUMENTS—METERS CONTROLS—REGULATORS

205—Draft Gages — Bulletins describe inclined, vertical tube, air filter gages, straight line and dial pointer, minified draft and receiver type gages, velocity gages and pitot tubes, gas analyzers and steam calorimeters.—ELLISON DRAFT GAGE CO.

212—Automatic Temperature Control —Data sheets describe versatile automatic indicating temperature control offering many sequence combinations—step-heating, heating and cooling, wide limit control, or temperature control plus operation of signal devices.—SARCO COMPANY, INC.

213—Meters & Controls — Bulletin G15-1 describes and illustrates systems and instruments used in the measuring, transmitting, receiving,

interpreting and controlling of 18 variables normally encountered in power plant and industrial plant operation. — BAILEY METER COMPANY.

222—Pressure Regulators — Catalog 76 — Gives complete detailed information covering applications, operation and specifications of Reducing Valves, Pump Pressure Regulators and Back-Pressure Regulators. Included is a simple, practical method for selecting size of regulators. — MASON-NEILAN CO.

252—Water Columns, Gages, Equipment — Brochure AO — Introduction to low pressure (0 to 250 psi) division of catalog data. Explains principles and construction of Reliance low pressure alarm water columns, and lists accessory equipment. — RELIANCE GAUGE COLUMN CO.

256—Boiler Control—On-the-job report of Carolina Power and Light Company's Louis V. Sutton plant in Bulletin 1032. Features: combustion, feedwater, boiler feed pump re-circulation controls plus automatic sequential soot blowing. — COPES-VULCAN DIVISION.

264—Liquid Level Control — 32 p Bulletin F-4 describes the Level-Trol for automatically maintaining liquid level at desired point in a heater, condenser, exchanger or other vessels. — FISHER GOVERNOR COMPANY.

268—Water Reducing Valve — Bulletin 553 describes how 50% greater capacity regulation is gained with Hi-Flo water pressure valve. Includes complete sizing data. — LESLIE CO.

270—Pneumatic Controller — Folio 57-2 covers units for transmitters with 3 to 15 psi output; proportional band adjustable from 2 to 500%; reset rate adjustable from 0.1 to 50 repeats per min. 3-15 psi output range with 18-20 psi supply air pressure. — REPUBLIC FLOW METERS CO.

287—Color-Port Water Gage — Bulletin WG-1814 describes the new gage for high pressure boilers (up to 3300 psi). Gives full details on design and operation and shows how it gives greater visibility and greatly reduced maintenance requirements. — YARNALL-WARING COMPANY.

PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

300—Cast Iron Welding—Data sheets describe the new Xyron 2-25 strontium-aluminum bearing electrode for crack-free welding of gray and ductile cast iron, including Meehanite, Ni-Resist, and for joining cast iron to steel. — EUTECTIC WELDING ALLOYS CORP.

306—Steel Buildings — Catalogs cover Series S buildings (clear span widths from 4-40 ft) featuring

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Steelox panel construction; and Series P buildings (clear-span widths up to 100 ft); fire resistant & weather tight; simplified design eliminates much job-site labor. — ARMCO DRAINAGE & METAL PRODUCTS, INC.

307—Condensate Drainage Control— Publication 6025 describes units for improving quality of heat transfer in process equipment through continuous return of condensate to boiler at high temperature and pressure. Lists many cases substantiating claim for increased heat transfer, more production with less fuel. — COCHRANE CORPORATION.

318—Wrought Iron — "ABC's of Wrought Iron"—A concise digest of more detailed technical handbook material on wrought iron—describes resistance to corrosion, fabrication

process—where needed—shock and vibration endurance.—A. M. BYERS.

334—Electric Power Hammer — Drilling, routing, cleaning, caulking, chipping are among many maintenance and construction applications described in Bul. 5199. Drills holes up to 1 1/4" in diameter; 2300 blows per minute; weighs only 12 lb, 13 oz. — INGERSOLL-RAND.

360—Gas Fired Heaters—P1-57 is pictorial report on typical installations of overhead Panel-Block heating units in wide variety of industrial plants.—Thermobloc Div., PRAT-DANIEL CORPORATION.

384—Grating — Three basic types described in 16 p catalog; dimensional drawings of thirty subtypes; eight safeload tables; selec-

tion and specifying information.—BORDEN METAL PRODUCTS CO.

392—Metal Cutters — Catalogs 718M & 755 describe three heavy duty units for cutting almost anything in metal up to 3/4"—rods, wire, chain, etc. — H. K. PORTER, INC.

PIPING, VALVES, FITTINGS STEAM SPECIALTIES, TRAPS

402—Forged Steel Valves—32 page supplement of Catalog F-9 covers new general purpose gate, globe and angle valves for 150-800 lb service. Featuring hard faced seating surfaces. — HENRY VOGT MACHINE CO.

407—Piping Materials — Bulletin reports on intensive investigation into problem of main steam piping materials and gives data on stress rupture characteristics of Types 316 and 347 stainless steel piping adjacent to welded joints. — PITTSBURGH PIPING AND EQUIPMENT COMPANY.

410—Piping Insulation Manual — "Technical Data Manual," 20 p booklet, gives engineers all available information on the application of Gilsulate, a new insulation for underground hot pipes. Describes three grades, how to determine ditch size for various pipes and types of soil, and gives sample problems.—AMERICAN GILSONITE COMPANY.

413—Reducing Valve — Bulletin 553 gives graphic performance comparison and capacity data of the new "Hi-Flo" valve for water reducing stations, fuel oil pressure control, process lines, etc.—LESLIE CO.

430—Check Valve — Catalog 30A highlights the "tilting disc" check valve for handling fluids or gases under wide range of pressures.—THE CHAPMAN VALVE MFG. CO.

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437 — Piping For Permanence — Bulletin covers a variety of services where wrought iron pipe saves because it serves longer. Corrosion costs you more than wrought iron. — A. M. BYERS COMPANY.

440—Jacketing "Check-Charts" — To help you estimate your aluminum jacketing requirements, manufacturer offers easy-to-use "Quick Check Charts" for .006, .016 and .020 jacketing. — ASECO, INC.

445—Heat Transfer Medium — How new solid medium can give you savings up to 75% over jacketed equipment outlined in brochure. Non-metallic plastic compound easily applied in paste form over either steam traced or thermal electric systems; wide temperature range. — THERMON MFG. CO.

464—Pressure-Seal Valves—Circular 16 gives information on the wide range of sizes and types of pressure-seal valves which are available in Series 600, 900, 1500 and 2500. — WALWORTH.

492—Pressure Reducing Valve — Bulletin D-92 shows how valve will minimize problems inherent in steam service. One pilot with three interchangeable springs provides range of from 2 to 150 psi. — FISHER GOVERNOR COMPANY.

493—Unions & Valves — Complete company line of pipe unions and check valves covered in Catalog 56. New Four-Star lug nut unions & spring controlled check valves included. — CATAWISSA VALVE & FITTINGS COMPANY.

MAINTENANCE PACKING GASKETS, LUBRICATION

500—Liquid Separator Filter — Low-flow Space-Saver Fram units, for solving separation problems in industrial plants described in Bulletin WL8-57. Easy installation; no maintenance except periodic replacement of cartridges and draining of sump. — WARNER LEWIS COMPANY.

504—Bearing Stock — Catalog No. 52 describes cast bronze bearing, bars and special parts. Gives engineering data. — THE BUNTING BRASS & BRONZE COMPANY.

506—Gage Glass Cleaning Tool — Data sheet No. 301 describes tool which uses brushes to quickly and efficiently clean inside of liquid level gage glass. — JERGUSON GAGE & VALVE CO.

507—Power Sweepers — Folder describes the "704" a compact unit for small plant budgets; designed for congested areas and narrow aisles;

gasoline, LP gas or battery powered. — WAYNE MANUFACTURING COMPANY.

511—Maintenance Ideas—"Genius at Work" — Contains ideas about plant maintenance, bits of philosophy, new products and a description of the company's line. — KANO LABORATORIES.

520—Lubrication Manual—Selection & application of right lubricant for 560 lubricated plug valve applications featured in 12 p manual. Service and temperature ranges tabulated. — WALWORTH COMPANY.

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531—Stack Maintenance — How wrought iron offers unique defense against flue gas corrosion described in bulletin "Wrought Iron for Flue Gas Conductors." — A. M. BYERS COMPANY.

533—Air Compressor Rod Packing — Catalog 56 shows how "Compressor" No. 760 stays flexible under intense dry heat and protects rods from premature wear. — THE BELMONT PACKING & RUBBER CO.

540—Welding Charts — Wall training charts TIS 2690 (Torch) and TIS 2689 (Metallic Arc) designed to fit into welding training programs. Correct welding procedures illustrated. — EUTECTIC WELDING ALLOYS CORPORATION.

ENGINES, DRIVES POWER TRANSMISSION MATERIALS HANDLING

601—Fluid Drive — Bul. 9819 describes features of improved Type T Gyrol Fluid Drive for general industrial applications. Applications and advantages noted; rating charts give hp ranges for various engine and electric motor drive speeds. — AMERICAN BLOWER CORPORATION.

603—Monorail Case Studies — File F-1—Offers 20 new studies of engineered monorail applications in various industries. Factual information, complete with photos and plain drawings. — AMERICAN MONORAIL CO.

609—Variable Speed Pulleys — Bulletin 118 describes units with 1/2" to 1 1/2" bores (max.); 3" to 13 1/2" O.D.; A to 2 1/2" TW belt sizes; 1-1 to

8-1 speed ratios; and 1/4 to 15 hp (1759 rpm) — LOVEJOY FLEXIBLE COUPLING CO.

614—Vertical Transportation — Elevator Catalog — Describes and illustrates details of passenger and freight elevators, escalators, dumb-waiters, and modernization and maintenance equipment for use in industrial, utility and service plants. — OTIS ELEVATOR CO.

619—Automatic Coal Scales — Bulletin 0352A covers Model H-39 (capacities up to 40 tons/hr) automatic coal scales. Coal never arches in feeder or weighing hopper — dust sealed; contact platework of stainless steel. — RICHARDSON SCALE COMPANY.

626—Personnel Elevators — Industrial personnel elevators, available in 1, 2, and 4 passenger sizes (300-1000 lb capacity), described in Catalog 5A-156. Gives specifications and dimensional layouts. — J. B. EHRSAM & SONS MFG. CO.

630—Mechanical Vibrating Conveyors — Catalog 890 gives information on conveyability and density of typical solid materials and provides data on how to "Do It Yourself" to get required length. — JEFFREY MFG. CO.

631—Screw Conveyors—Catalog ID-541, 68 pages — Illustrates and describes standard and special types of conveyors, with engineering data necessary for selection. Tables give sizes, types, speeds, horsepower and other information. Accessories included. — CONTINENTAL GIN COMPANY, INDUSTRIAL DIVISION.

632—Gearmotors & Package Drives — 8 p booklet DB-3650 illustrates horizontal, vertical, right angle, open, enclosed, explosion-proof, a-c & d-c units with respective reduction ratios and output speeds. Speed range from 7.5 to 760 rpm. — WESTINGHOUSE ELECTRIC CORP.

648—Belt Fastening Tools — Bulletins F-110 and F-111—Describes new Flexco power tool wrenches and power tool boring punches, designed to speed up fastening of wide conveyor belts; and give recommendations on the use of various impact tools connected therewith. — FLEXIBLE STEEL LACING CO.

661—D-C Crane Control — 8 p Bulletin GEA-6434 features precision hoist, bridge and trolley control systems. — GENERAL ELECTRIC CO.

676—Variable Speed Motors — Bulletin No. 188 describes company's Speed-Trol Variable Speed Motors

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Bulletins (Cont'd)

which assure optimum productivity regardless of manufacturing variables and which prevent obsolescence of machinery due to changes in processes or production volume. — STERLING ELECTRIC MOTORS.

WATER TREATMENT, HEATING VENTILATING, AIR CONDITIONING REFRIGERATION, DUST & FUME CONTROL

700—Water Conditioners — 4 p

Brochure describes Anco water conditioners for hot-water and humidifying systems. Stop rust and corrosion; prevent discolored water. — ANDERSON CHEMICAL COMPANY, INC.

702—Water Conditioning — Bulletin

611A, 20 pages—Gives comprehensive data on methods of conditioning water for boiler, process and general use, featuring zeolite water softeners of "double-check" design. Data on filters, purifiers, zeolites, ion-exchange resins, de-gasitors. — ELGIN SOFTENER CORPORATION.

716—Dust Collection — Whether

nuisance elimination or process material recovery, check on Whirlex Dust Collector Units. Engineering data available. — THE FLY ASH ARRESTOR CORP.

718—Zeolite Softeners — 20 p Cata-

log 4520 describes the sodium zeolite softening process in detail. Contains data required for proposals, lists factors important in selection of proper zeolite material and in sizing of equipment. Single valve controls all cycles of service and regeneration. — COCHRANE CORPORATION.

720—Power Roof Ventilator — 4 p

Bulletin 550 illustrates and describes company's Centrator, the centrifugal power roof ventilator with the exclusive "jet siphon." Includes capacity and dimension tables. — CLARAGE FAN CO.

723—Dust Collection — Catalog de-

scribes mechanical and electrical systems which meet most rigid anti-air-pollution codes; low resistance fly ash collector which combines top efficiency with low draft loss for natural or forced draft installations. — BUELL ENGINEERING COMPANY.

725—Cooling Tower — 32 p Bulletin

DT-57-1 describes induced-draft counterflow cooling tower. Describes construction and operation of all major parts, effects of recirculation and surroundings. Illustrated. — FOSTER WHEELER CORP.

775—Fan Utility Sets — 52 p Bulletin 8314 covers fan wheels and motors — selection criteria, capacity tables & typical specifications. — AMERICAN BLOWER DIV.

ELECTRICAL

825—Weather-Protected Motors — Bulletin 51B8606A describes features which contribute to outdoor dependability of company's weather-protected motors (Type FOD) in ratings from 250 to 900 hp.—ALLIS-CHALMERS MFG. CO.

835—Motor Starter & Contactors — 12 p Bulletin 14B8615 describes sizes 4, 5 & 6 (Type 425), 50 to 400 hp. Contactors incorporate arc centering blowout, which eliminates need for conventional blowout coils.—ALLIS-CHALMERS MFG. CO.

841—Applying Electric Heat — "101 Ways to Apply Electric Heat"— Gives illustrated case histories showing experience-tested methods of applying Chromalox electric heating elements. Physical aspects of installation are shown along with the description of the problem, solution and advantages obtained — EDWIN L. WIEGAND CO.

855—Wiring Analyzer—4 page bulletin describes Model 301 Adequate Wiring Analyzer which quickly, simply and easily tests wiring without confusing calculators or slide rules.—SPRAGUE ELECTRIC COMPANY.

871—Electrical Protection — Protection Handbook — Tells how to protect motors, apparatus and circuits. Gives National Electrical Code requirements in simplified form. Designed to help the electrical or plant maintenance engineer.—BUSS-MANN MFG. CO.

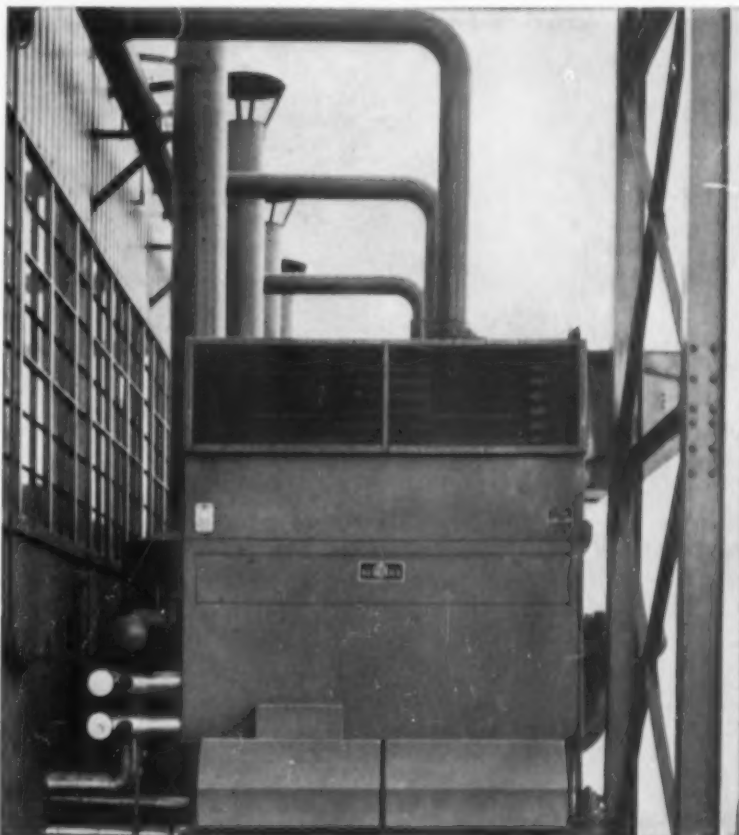
884—Portable Cords—Bulletin covers complete new line — Security-flex cords for severest applications; Industrial "all-purpose" cords for hard usage; and Service cords for shop appliances. — ANACONDA WIRE & CABLE COMPANY.

889—Transformers — Open dry-type units, rated 300 kva and above, 15 kv and below to meet general industrial requirements described in Bulletin GEA-6668. Three types of high-voltage terminations. — GENERAL ELECTRIC.

OPERATING AIDS SUPPLIES & MISCL.

911—Rescue Kit — Bulletin 733 describes unit and procedures for freeing persons trapped in cars, buildings, under machines, in elevators, etc. — H. K. PORTER, INC.

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Save the cost of Cooling Water and you save the price of the
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(for compressed air or gas) in less than two years.

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Niagara Aero After Cooler cools compressed air or gas (evaporatively) below the temperature of surrounding atmosphere, with no further condensation in your air lines.

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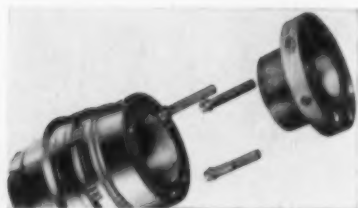
NIAGARA BLOWER COMPANY

Dept. S.P.-12—405 Lexington Ave.

New York 17, N. Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

NEW Product Briefs



Flexible Couplings

M-1

A new line of flexible couplings taper-bored for use with "QD" Taper Bushings has been announced by **Lovejoy Flexible Coupling Company**, 4899 W. Lake St., Chicago 44, Ill. Six different sizes range from 22 to 150 hp at 1750 rpm. Stock bushing bore sizes begin at $\frac{1}{8}$ " and progress to $3\frac{1}{2}$ " by sixteenths-of-an-inch. The couplings will accommodate standard "QD" Bushings, including types SD, SK, SFG and CE.

These couplings have been adapted to taper bushings to provide three important advantages: (1) reduction

of normal stock requirements of coupling bodies; (2) immediate availability of a wide range of shaft sizes from this reduced stock by means of a convenient complementary stock of "QD" bushings; and (3) a coupling-bushing combination that affords easy fastening to the shaft with the firmness of a shrunk-on fit.



Pneumatic Grinder

M-2

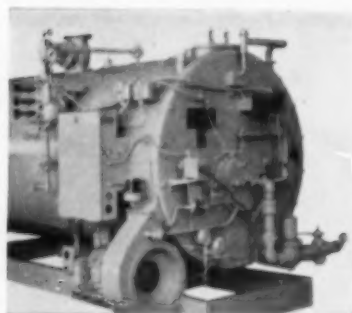
Latest in the Cleco line of pneumatic hand tools are the new 1500 Series Grinders available, from **Cleco Air Tool Div.**, Reed Roller Bit Co., 5125 Clinton Dr., Houston 20, Texas. Designed

for use in a variety of metal grinding, sanding and wire-brushing operations, the design of these new air tools has been thoroughly tested in use.

In addition to the usual advantages of air tools over other types of power hand tools—low maintenance, long life and simplicity of overhaul—is exceptionally lightweight construction due to the extensive use of magnesium alloy castings. A special muffler handle reduces noise and serves as an air exhaust, eliminating unnecessary holes in the grinder casing and preventing the access of harmful particles.

The basic tool is available in a variety of speeds and for several different wheel and guard mountings to meet virtually every type of grinding, sanding and brushing requirement.

For More Free Data **CIRCLE CODE NO.** on the Handy Return Card — Page 99



New "Package" Boiler

M-3

The new Model "R" Ames steam Generator automatic boiler, offered at a new low price by **Ames Iron Works, Inc.**, Box 15, Oswego, New York, is available in sizes 10 to 150 hp (100 hp unit illustrated) for pressures up to 250 psig for oil, gas or combination oil-gas firing equipment.

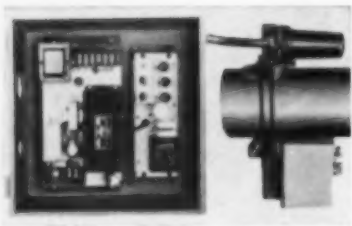
Compact construction saves floor and operating space, and new centralized controls save operating time. Basic design is essentially the same as the unit's predecessors — Model "X" and Model "Y." Three-pass concentric tube design is retained, as well as plastic refractories. Relocation of auxiliaries and controls greatly simplifies operation — fuel pump relocation eliminates need for booster pumps to overcome resistance of long runs of suction piping.

All wiring and piping to components mounted on the boiler are completed at the factory. As with all Ames boilers, Model "R" units are fire-tested.



CATAWISSA VALVE & FITTINGS CO.

CATAWISSA • PENNSYLVANIA



Radiation Type Density & Gravity Controller

M-4 Instruments, Inc., 122 N. Madison, Tulsa, Oklahoma have developed the JSP-173A — a unit for recording and controlling gravity or density in a process material flowing thru a pipe.

No part of the equipment comes in contact with the process materials so that it cannot be affected by even the most corrosive materials. It requires no drilling of holes or welding of brackets, and can be easily removed for use in another location when desired. The JSP eliminates sampling and costly laboratory diagnoses.

When used with a satisfactory controller, it will provide accurate control of density or gravity within very close limits. When used with a recorder, it will indicate changes in gravity, interface level of different materials, and solids content in liquids from 1% to 25%.

Recording and controlling devices can be located up to 2000 ft from the material gauging point.

Since there are no moving parts in the JSP-173A equipment, long periods of trouble-free operation can be assured.



Speed Variator

M-5 A new line of packaged adjustable speed drives has been announced by General Electric's Direct Current Motor and Generator Department, Schenectady 5, N. Y. Designed for minimum maintenance, the new Speed Variators are available in ratings of 3 through 150 hp and in speed ranges of 3 to 1 and higher.

Speed Variators are designed for use on continuous processing lines, calender drives, machine tools, crane hoists, metal rolling and blooming mills, paper processing machinery or wherever adjustable speed for fine control is needed.

A new Amplistat regulator with silicon rectifiers is standard on the new line. The regulator provides smooth, timed acceleration and deceleration to preset speeds in addition to voltage regulation. New static excitation system with silicon

rectifier has no moving parts and requires no warm-up period.

The motor-generator set is of two-unit, four-bearing design. Proven Tri-Clad 55 a-c motor and d-c generator are connected by flexible coupling for ease of service. Standardized power unit control devices are unit-mounted and front-connected. Recessed wiring troughs eliminate wiring harness and improve accessibility. Incoming power and control connections are simplified by terminal boards.

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ANNOYING SKIN
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SKIN CLEANSER

*"Keep their hands
clean and germ free"*

WITH EFFICIENT DISPENSERS

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THROUGHOUT YOUR PLANT



VI-LAN
ANTISEPTIC PASTE CLEANSER
WITH LAN ACT 12



No. 60-70



No. 50

Recognized throughout industry as a superior, heavy duty paste-cream antiseptic skin cleanser, VI-LAN fortified with Lan Act 12, is properly dispensed with portable and stationary dispensers conveniently placed on work benches, service trucks, oil rigs, laboratories, store rooms, work carts, lavatories, and in EVERY WASH ROOM. Used WITH OR WITHOUT WATER, Vi-Lan removes greases, oils, paints, tars, acids, asphalt, pipe dope, rubber, etc., inhibits dermatitis, and serves to eliminate lost man hours and expensive compensation claims. It drastically reduces hand-cleaning costs, and removes stubborn soils in less time than conventional soaps and detergents. IT DOES WHAT SOAP CAN NOT DO, and its 12 zolin content preserves natural skin qualities.

DAMERON
enterprises, inc.
427 So. 20th Street
Louisville 3, Kentucky

Write for
descriptive
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All Plastic Strainer

M-6

The first all-plastic Y-sediment strainer has been introduced by the **Walworth Company**, 60 East 42nd Street, New York 17, N. Y. Made of highly cor-



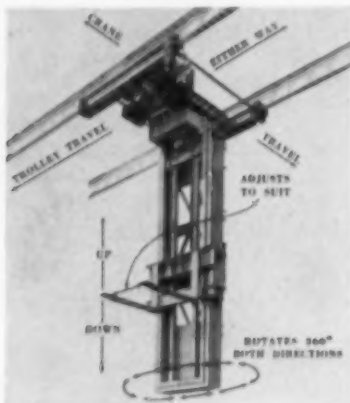
rosion resistant rigid polyvinyl chloride, the new strainer is designed for service on alkalis, acids, inorganic salt solutions and other corrosive materials.

Strainer is of rigid PVC sheet with 1/32" holes. Open area of the perforated screen is at least twice the cross sectional area of corresponding Schedule 80 pipe, thus assuring adequate flow.

Light in weight, the strainer is easily handled and installed. The screen, which is welded to the strainer cap, is merely unscrewed for cleaning.

The new PVC strainer has a serv-

ice rating of 150 psi at 75 F and 75 psi at 150 F. It is available with either threaded, solvent-weld socket-type or flanged ends, and comes in five sizes from 1/2 through 2 inches.



Overhead Fork Lift

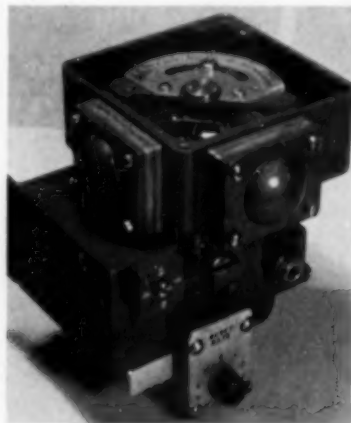
M-7

A new, heavier, more versatile overhead fork lift has been developed by the **Cleveland Tramrail Division**, The Cleveland Crane & Engineering Co., Wickliffe, Ohio.

When on a Cleveland Tramrail crane, it can be traveled to front, rear or either side of a building, up, down and turned through a full circle clockwise or counterclockwise.

The overhead fork lift is particularly advantageous for handling and storing materials in warehouses such as boxes; crates; rolls of carpeting, cloth, paper; pipes; bars; packages of sheets and plates; drum of paints and chemicals; pallets and tote boxes.

The fork lift illustrated is powered with three motors. One propels the unit on a crane bridge, or a two-track runway, driving wheels on both sides by means of a jack shaft. The fork hoist motion is operated by a motor driving heavy chains connecting with the fork and a counterweight. Rotation is accomplished by means of a motor driving a large gear at top of unit.



Pneumatic Controller

M-8

A type VC pneumatic Controller that features a simple, easy proportional band adjustment from 2 to 500% and less than .05% dead band, as well as either remote pneumatic or local spring set point adjustment, has been developed by **Republic Flow Meters Co.**, 2240 Diversey Parkway, Chicago 47, Ill.

Loosening a lock screw and moving it along a scale changes the proportional band. Needle valve permits repeating a reset rate without trial and error. Reset rate is from 0.1 to 50 repeats per minute.

VC controllers can be furnished for either panel or post mounting and with a weather-proof cover. Standard pressure ranges for feedback, pneumatic set point and output are 3 to 15 psi. Air supply required is 0.2 SCFM at 18 to 20 psi. Details are given in company's Folio 57-2.

#55 FACED MECHANICAL SEALS RESIST WEAR AND CORROSION



#55 FACING MATERIAL

THIS BULLETIN TELLS THE STORY

... For further details write today for a copy of Bulletin No. 469 SP

*ROKIDE Process Coating developed by the Norton Co. of Worcester, Mass.

A new and superior facing material is now available on the engineered mechanical DURA SEAL. #55 faced seal rings are long-wearing, operate at extremely high or low temperatures, and present highest resistance to wear and corrosion. #55 Facing Material combines the low-friction benefits of ceramic materials with the strength and resistance of alloyed steels.



New Product Briefs (Continued)



Quick-Make, on manually-charged breaker, is obtained by storing energy in springs by operation of pull-down handle. Top photo shows frozen-action shots of handle positions. In bottom position, spring energy is released to close contacts.

Lower photo shows how breaker can be moved to test and disconnect positions without opening compartment door. Small crank is inserted thru lift-shutter opener. Shutter cannot be lifted until breaker is tripped. Breaker cannot be closed while crank is inserted.



Accessible trips, on both manual and electrical types, provide a new ease of adjustment. All three trips for this 600 amp breaker are mounted on single molding.

Low Voltage Power Equipment Offers Many Design Advances

M-9

The new K-line of low voltage switchgear by the Switchgear Division of I-T-E Circuit Breaker Co., 19th & Hamilton, Philadelphia 30, Pa., offers a quick-make manual closure, closed-door draw-out operation, sub-assembly breaker construction, four-high stacking of 600 amp frame size, stored-energy electrical closure and greatly increased accessibility.

New line includes three frame size ratings: 225, 600 and 1600 amp continuous, at 600 volts a-c.

Design advances in the new K-line circuit breakers, which will be sold to independent switchboard assemblers in addition to use in I-T-E's own switchgear, include:

Quick-make manual closure — a feature that can greatly prolong the life of contacts and even of the breaker, itself, by eliminating damaging arcing that results from slow, careless closure by hand.

Motor-driven stored-energy system for electrically-actuated models. This stores energy for closure, thus cutting drain on breaker's secondary circuit from as much as 160 amp down to 10 amp.

Greatly reduced size and weight — a design and installation advantage for switchboard assemblers and a convenience in servicing for equipment users.

Sub-assembly construction. Six sub-assemblies take the place of the 130 separate major parts in previous models. A part replacement formerly requiring an all-day overhaul of the breaker may now be only a one-hour matter of removing and replacing a unit sub-assembly.

Interchangeable overcurrent trips — now readily replaceable, through use of sub-assembly construction, to facilitate planned increases in load capacity.

Complete accessibility of trip units — the result of a more open breaker design. Even in electrically-actuated models where motor and additional accessory controls are built into the breaker, the user still has complete access for setting or removing trips.

Simplification of trip continuous current ratings — 9 trip units now cover complete range of continuous current ratings — from 15 to 1600 amp — that formerly required 23 different trip units.

Automatic trip indicator — shows

that the breaker has tripped on over-current or undervoltage.

Pull-down handle actuates the stored-energy closing system. The handle's streamlined, semi-flush design prevents accidental breaker tripping.

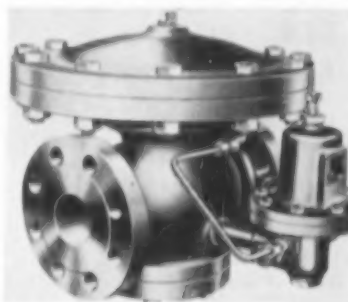
I-T-E's new switchgear — in addition to advances of the incorporated K-line circuit breakers — also have the following design and construction innovations:

Closed-door draw-out. For the first time switchgear doors can be kept shut under all conditions of breaker tests and operation and during movement to all positions. In addition to added safety, this protects breaker from atmospheric dirt, dust and other foreign matter in many applications.

Smallest size — of any comparable low voltage power switchgear. New I-T-E units are narrower than similar equipment.

Unitized construction that reduces switchgear to three basic components — the breaker, the switchgear enclosure and a cradle assembly on which breaker slides for drawout. Standardization of this assembly and the switchgear enclosure simplifies interchange of various size breakers.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 99



Steam Reducing Valves

M-10 The Fisher Governor Company of Marshalltown, Iowa, has announced the

development of an improved version of its time-tested series of pilot operated reducing valves for steam service. The Fisher Type 92B is a completely self-operated unit, obtaining pilot operating medium directly from the inlet. This feature makes the Type 92B desirable for applications where air or gas as an operating medium is not available or where its use is not practical.

The Type 92B is designed to minimize problems inherent in steam regulation such as clogged orifices, sticky valves and diaphragm rupture.

COMFORT OR PROCESS AIR HEATING TEMPERATURES

ACCURATELY
MAINTAINED
WITH

CHROMALOX ELECTRIC AIR DUCT HEATERS

For heating air or gases under forced circulation, Chromalox Electric Air Duct Heaters are the efficient, economical answer. Temperatures to 1050°F.

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Heaters can be installed quickly and easily in round or rectangular ducts and accurately controlled either manually or by automatic thermostat.

120, 208, 240 and 480 volts. 91 standard stock types, sizes, ratings ready for immediate delivery.

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Call your Chromalox
Representative or write
for Bulletin F-1559



Edwin L. Wiegand Company

7563 Thomas Boulevard, Pittsburgh 8, Pa.



New Products (Cont'd)

Underground Pipe & Cable Locator

M-11

A pipe and cable locator, available from **Western Carolina Controls Company**, 78 Fairway Drive, Beverly Hills, Asheville, N. C., locates and follows underground, under-water or otherwise concealed metallic conductors. The maintenance sleuth — the "Rube-G" — also locates grounded faults on normally ungrounded conductors.



Locator consists of impulser, amplifier, search coil, head phones and operating battery in a single carrying case. The signal is audible 40 or more feet away from the conductor.

Amplifier is completely transistorized; search coil designed for NUL point determination. Operation extremely simple. Only three small items, totalling 32 ounces, are carried. Model A uses 115 v a-c auxiliary power; Model TM, for truck mounting, uses the truck's 12 v battery for auxiliary power. Complete brochure with instructions upon request.

For More Free Data **CIRCLE CODE NO.**
on the Handy Return Card — Page 99

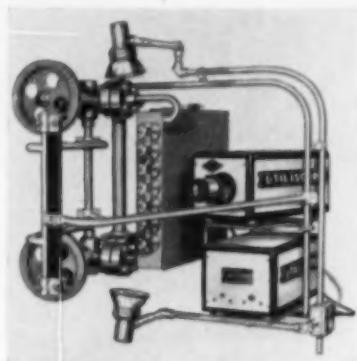
Package Unit — Water Gauge and Wired Television

M-12

For quick, easy and inexpensive installation of closed circuit television to watch a "Multi-Port" or continuous vision water level gauge, **Diamond Power Specialty Corp.**, Lancaster,

Ohio is offering a package combination called the Diamond Utili-Mount.

Installation is simple — mount the gauge, plug in one electrical connection and run a single coaxial cable to the television viewing screen at any desired point.



Gauge connections are furnished to the requirements of the drum and the rest of the package is permanently mounted on the gauge. Gauge is read accurately on the viewing screen which can be located on the boiler control panel or at any other convenient point.

The Bi-Color feature of the gauge always shows steam as red and water as green. The "Utiliscope" transmits the image of the gauge to a television viewing screen where water always shows black, and steam white.

Level Detector for Liquids, Solids & Slurries

M-13

For accurate and versatile high or low point detection or narrow range proportional control of liquid, solid and slurry levels, **Automation Products, Inc.**, 3030 Max Roy St., Houston 24, Texas has developed the Model CL-10 Dynatrol.

The control has a positive acting electrical output control signal that varies with the amount of immersion of the 120 CPS vibrating paddle in the medium being detected. The output signal can be used to control the operation of any type of electrical equipment.

Design allows sensitive transmission of vibrational energy from the driver end to the sensing paddle and back to the output signal end through a linkage path welded to rigid metal pressure seals at the node points where zero amplitude of vibration occurs. Unit rated for 3000 psig pressure — explosion proof 115 v a-c — corrosion resistant — any mounting position with only 1/4" NPT pipe opening required.



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Pressure vessels fabricated by FINNIGAN are built to rigid ASME Codes! Over 65 years of plate fabrications have given FINNIGAN Engineers and Craftsmen the know-how to build the finest of equipment. That's why the FINNIGAN guarantee can specify that equipment by FINNIGAN is equal to or better than that of any other manufacturer!

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100% AUTOMATIC TANK GAUGING

Dependable remote reading tank contents gauges using a closed hydraulic transmission system. No power required.

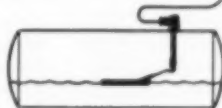
Several sizes available. Approved by Underwriters Laboratories and Factory Mutual. UL approved switches.

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AS DEPENDABLE AS MAGNETIC FORCE ITSELF

● No matter how specialized the liquid level control application, adapting Magnetrol to meet it presents no problem. Whether it's for high pressures, high temperatures, corrosive liquids or any other condition, a few "standard" modifications and the job is done! Operation is so simple no changes in basic design are needed. That's why Magnetrol "fits" practically any application — why "specials" are so often standard with us.

Because of the utter simplicity and dependability of its magnetic principle, Magnetrol has *infinite* operating life. There are no wearing parts to get out of order.

Magnetrols are available for controlling level changes from .0025-in. to 150-ft., with single or multi-stage switching. Our experienced engineering staff is at your service.

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Magnetrol, Inc., 2118 S. Marshall Blvd., Chicago 23, Illinois
Please send me catalog data and full information on
Magnetrol Liquid Level Controls.

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ESPECIALLY
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HEAVY LOADS**



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are grease type lubricants especially formulated for use in bearings and on other machine parts subject to heavy loads. Have extremely high film strength, marked adhesiveness and water repellence.

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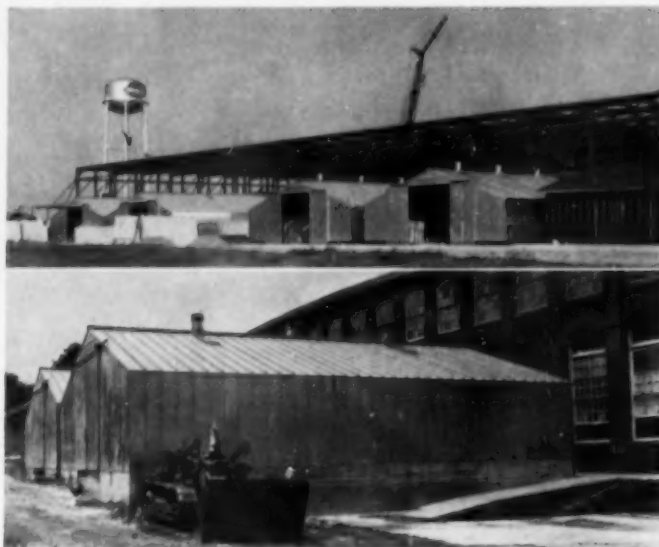
are most satisfactory fluid type lubricants over a wide range of temperatures. Due to their high film strength, they are ideal for use where heavy loads are encountered.

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Southern News Briefs (Continued)



Buildings Saved for Another Day

Usual practice of destroying temporary storage and field office buildings after a plant is erected was reversed at the new Carlisle Finishing Company plant, Carlisle, South Carolina. This company is a division of Cone Mills Corporation.

While the large plant was being constructed, textile machinery scheduled for installation was arriving at the site. To protect it from the weather, four Armco (Armco Drainage & Metal Products) special utility buildings (top photo) were quickly erected.

After serving their purpose, two of the steel-paneled buildings were easily dismantled and shipped 150 miles to the corporation's White Oak plant at Greensboro, North Carolina, to serve as storage buildings (lower photo). The remaining two steel structures were sent to another plant at Greenville, South Carolina, for the same purpose.

Black & Decker — Md.

Three major manufacturing appointments are announced by The Black & Decker Manufacturing Company, Towson, Maryland: **John M. Fox**, Hampstead Plant Manager; **Karl B. Salanda**, Director of Industrial and Plant Engineering; and **Wm. B. Ford, Jr.**, Towson Plant Manager.

John Fox, the oldest employee of Black & Decker recently received his 45-year service pin, was manager of the electric tool company's Towson, Maryland plant before his recent appointment. The plant in Hampstead, Maryland which he will now be in charge of is the Company's largest, occupying a manufacturing area of 470,000 sq ft.

Karl Salanda was manager of the Hampstead plant until his recent appointment. As Director of Industrial and Plant Engineering, he will be responsible for the direction of Industrial Engineering, Tool Engineering, and Plant Engineering. This post was created recently as a result of the electric tool company's general growth.

William Ford began his career with Black & Decker in 1934 as a machine operator, subsequently being promoted to General Foreman and then Supervisor of the Engineering Department. He left the Company in 1951 to accept the position of Plant Manager for the Aro Equipment Corporation of Bryan, Ohio, where he stayed until his return to Black & Decker.



Edward Wendell, Gerald Stone, and William Palmer

Southwestern Changes for Link-Belt Company

Link-Belt Company has announced the retirement of **Edward G. Wendell**, district manager of the Dallas office and factory branch store, after 42 years of service with the company. Mr. Wendell joined the company in 1915 as an engineer at the Chicago Plant. In 1926 he was appointed district manager at Dallas and was responsible for the opening of the Dallas warehouse in 1934.

Gerald A. Stone, former district manager of the **Shreveport** office, succeeds Mr. Wendell. Mr. Stone

joined **Link-Belt Company** in 1945 after graduation from **Texas A & M** with a degree in engineering. He served in the Dallas engineering department, followed by appointment as sales engineer in the Dallas area and as district manager at the **Shreveport** office.

William R. Palmer, of the Philadelphia district office has been appointed district manager of the **Shreveport, Louisiana** office succeeding Mr. Stone. Mr. Palmer is an engineering graduate of **Purdue University** and joined the organization in 1948 at the **Indianapolis** plant. Since 1949 he served as district sales engineer at the Philadelphia office.

Copeland — Southwest

Copeland Refrigeration Corporation has announced the appointments of **Louis A. Wallace** as field representative for **Texas** and **Oklahoma** and of **John Young** as district sales representative for **Kansas, Missouri**, and **Southern Illinois**.

Mr. Wallace will have headquarters in **Fort Worth, Texas**.

Clark — South & Southwest

New dealers have been appointed to sell and service the line of fork trucks, straddle carriers, towing tractors and powered hand trucks produced by the **Industrial Truck Division of Clark Equipment Company**.

AAA Equipment Service Company, 3338 South Jefferson St., **St. Louis**, will handle Clark sales in eastern **Missouri** and 23 counties in southwest **Illinois**. **Steve Ragsdale** is president of the new dealership and **Samuel R. Kessler** is vice president.

Rushton Equipment Corporation, Lomb Blvd. and Alabama Ave., **Birmingham**, will handle Clark sales in northern and central **Alabama**. **Allen Rushton** is president of the new distributorship and **Garnett A. Vining** is executive vice president and general manager.

Allis-Chalmers — Memphis

The **Tennessee Valley Electric Supply Company**, 296 Adams Avenue, **Memphis**, has been appointed an agency for **Allis-Chalmers** feeder voltage regulators, power transformers, units substations, switchgear, and circuit breakers in the **Memphis** area.

Tennessee Valley Electric Supply was established in 1934 and has been a distributor for **Allis-Chalmers** distribution and instrument transformers since 1956.

L. E. Salmon is president and **Harold E. Sartin**, sales manager of the company.

In 2 hours you can
add years to boiler life



It usually takes less than two hours to install a **National Seam Protector**. And this small job will avert failure of a riveted seam indefinitely.

No one can predict when the girth seam of a riveted **HRT boiler** will start leaking due to buckling of the outer lap. It's better to insulate the seam before the damage occurs, thus avoiding expense and hazard.

Ask us for complete information. Do it now while the subject is on your mind.

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AIROIL
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BURNERS**

**SERVING
INDUSTRY
FOR 45 YEARS**

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- Combination Gas and Oil Burners
- Tandem Block Combustion Units
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Southwestern Division
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Southern News Briefs (Continued)

Square D — Atlanta Plant

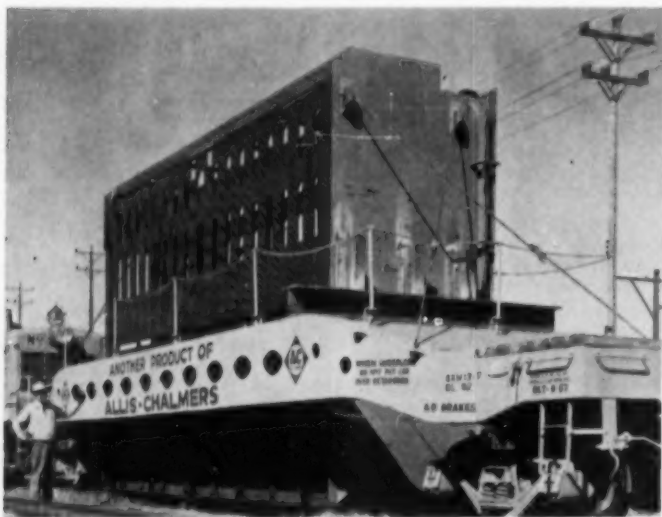
Square D Company has completed the construction of an electrical equipment assembly plant in Atlanta as the base of expanded operations in the Southeast United States. The company's field engineering offices in Georgia, Florida, Alabama and other area states are being augmented as the expansion program develops.

Construction of the local plant in a new industrial development in the city's northwest section—on Marietta Boulevard south of Chattahoochee Street — required approximately one year to complete. Involving an initial investment in excess of \$500,000 and designed to permit future additions, the 31,000 sq ft structure houses Square D's regional headquarters offices previously based in

another section of Atlanta, as well as facilities for the assembly of switchboards, circuit breakers, control centers and related products for residential and industrial applications.

Directing the Atlanta plant operations are **Steve Kovach** as manager, formerly of Detroit, and **S. T. Walz** of Atlanta, as southeastern regional sales manager who has been associated with the company's marketing activities in the area for the past 20 years.

Square D is one of the nation's largest manufacturers of electrical equipment with sales last year in excess of \$100,000,000. As part of an extensive capital expansion program, the company is building a large plant in Lexington, Kentucky, and presently has major manufacturing units in Detroit, Milwaukee and Cleveland.



King Size Condenser for Virginia

Appalachian Electric Power Company's new Clinch River Plant is the destination of this section for a 130,000-sq ft single-shell condenser, largest of its type shipped to date by Allis-Chalmers. Separated into four parts to meet shipping clearances, this section of the condenser is shown aboard a specially-designed and built "well" center railroad car, one of two owned by Allis-Chalmers.

Shipment of the condenser was made to coincide with completion of the enlargement of a Norfolk & Western Railway tunnel in Virginia enroute to the Clinch River Plant. This installation will be somewhat unusual in that the condenser will be substantially on the same elevation as the axial-exhaust turbine. This arrangement results in improved economy of turbine operation as well as reducing the depth and volume of basement with consequent reduced construction costs.

Carbide's Ralph D. Webb Receives I.S.A. Honor

Ralph D. Webb, head of the instrument department of **Union Carbide Chemicals Company's** South Charleston, West Virginia plant and veteran of 33 years in the instrument field, has been elected to Honorary Membership in the Instrument Society of America. This award is the highest honor the Society can bestow in recognition of an individual's outstanding contributions to the art and science of instrumentation and automatic control.

Ralph Webb supervises all aspects of instrument engineering operations in the South Charleston plant. During World War II, he personally designed the instrument engineering for Carbide's butadiene-from-alcohol process, which was responsible for the production of 75% of all butadiene produced in 1943 and 65% of all produced from 1944 to V. J. Day in 1945 — an important factor in the winning of the War. After the War, the following were developed under his personal supervision: all-plastic instrument tubing, a very successful infra-red gas analyzer now used to control many of Carbide's processes, and the plant-type gas chromatograph.

Mr. Webb has one of the longest terms of service in the instrument industry, having served from 1924 to the present with Carbide for a total of 33 years.

Drive Controls for Southland Paper — Tex.

A new multiple generator transistor-amplistat control for sectional paper machine drives has been ordered from the General Electric Company by **Southland Paper Mills, Inc.** of Lufkin, Texas.

This application of the new control system will be made on a 270-inch-wide Pusey and Jones paper machine to be used in the production of newsprint. Speed regulation accurate to plus or minus 0.1% will be provided over a speed range of 1000 to 2700 fpm. The control also makes possible operation at slow speeds of 50 to 150 fpm for felt and wire inspections and wash-ups.

A total connected load of 3100 hp will be controlled by the new system which is being manufactured at General Electric's Industry Control Department, Roanoke, Va., for installation during the second quarter of 1958.



**"Why Not Play Safe And
Buy Your STACK As
You Buy Your Car?"**



"Joe, you wouldn't buy the engine of your car from one manufacturer, the wheels from another and the body from still another, would you? Neither would I. And when I design for induced draft, I specify a P-D Stack because the I.D. Fan, though it is important, isn't the whole story. The combined breeching, stack and fan, built as ONE apparatus, gives me unit responsibility, compact design, simplified engineering, and positive performance, with a lot less purchasing details.

"Another thing, I'd rather buy my Dust Collector from the same manufacturer that made my Stack and Fan. For this is all part of the same system for handling the gas after it leaves my boiler unit.

"There's nothing like putting all the responsibility on ONE manufacturer's shoulders if you can, for then you'll come out on the long end nine times out of ten. Buying such equipment piece-meal is antiquated and costly."

You can save a lot of time, trouble and money by purchasing your Stack and Dust Collector from Prat-Daniel.

Write for data.



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POWER DIVISION: Tubular Dust Collectors, Forced Draft Fans,
Air Preheaters, Induced Draft Fans, Fan Stacks

SOUTHERN POWER & INDUSTRY for DECEMBER, 1957

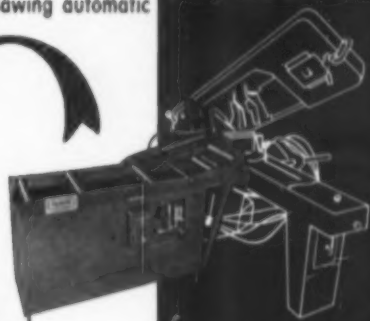
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KALAMATIC

... makes sawing automatic



**AUTOMATIC
BAR-FEED
ATTACHMENT**



Featuring:

- Quick easy installation and adjustment.
- Accurate repetitive cutting with no intricate electrical equipment to go out of balance.
- Completely enclosed oil tank and ball bearing table rollers.

Machine Tool Division

Kalamazoo

The Kalamatic automatically feeds rounds, flats, hex, pipe, tubing to most Kalamazoo metal cutting band saws—any length from 3/16" to 30". Thoroughly automatic, The Kalamatic helps prolong the blade life of the saw.

TANK and SILO CO.
508 HARRISON ST.
KALAMAZOO, MICHIGAN

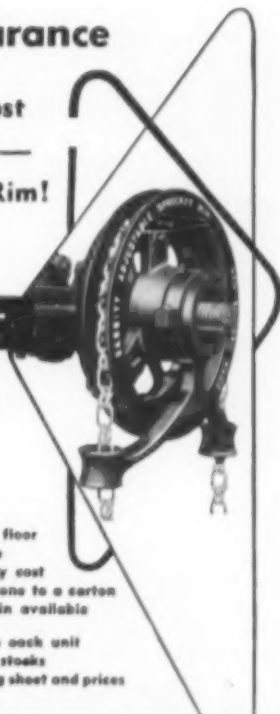
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Babbitt Sprocket Rim!**

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*Adjustable
SPROCKET RIM
with Chain Guide*



- Simplifies pipe layout
- Fits any size valve wheel
- Easy to install and operate
- Operates any valve from plant floor
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- Hot galvanized, rust-proof chain available for all sizes
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- Your supplier carries complete stocks
- Write for new descriptive catalog sheet and prices

Babbitt STEAM SPECIALTY CO.

3 BABBITT SQUARE, NEW BEDFORD, MASS., U.S.A.

For more information, use Reply Card—Page 99

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Southern News Briefs (Continued)

Air Reduction — South

H. C. Wallace, assistant regional sales manager of the Southern Region of **Air Reduction Sales Company**, has been appointed regional sales manager of that region, succeeding M. G. Wicker, resigned. Mr. Wallace will maintain his office at Houston, Texas.

Mr. Wallace began his association with Air Reduction in 1929 at the Louisville, Kentucky office, and has progressed through various sales positions over the years. His previous headquarters were in Louisville, Kentucky.

A. W. Gilpin, assistant sales manager at Houston, has been appointed assistant to the regional sales manager. R. Pringle, salesman, succeeds Mr. Gilpin as assistant sales manager.

Reynolds Aluminum Supply Company

To more accurately portray the company's present-day operations as a distributor of aluminum products, Southern States Iron Roofing Company stockholders recently voted to change the firm's name to **Reynolds Aluminum Supply Company**.

The company, established 43 years ago in Savannah, Georgia as a steel roofing fabricator, has become the largest of its kind in the South with manufacturing plants in Atlanta and Birmingham and nine warehouses located in Atlanta, Savannah, Memphis, Nashville, Louisville, Richmond, Raleigh, Birmingham and Miami.

Paul H. Fox, President of the company, a Reynolds Metals Company subsidiary with headquarters at 573 West Peachtree St., N.E., Atlanta 3,

Ga., explained that industrialization of the South has been followed naturally by development of local sources of supply. The light metals field has expanded vigorously to meet the needs of customers in this region. Southern States has become one of the South's leading suppliers of aluminum for industrial applications and the building material field, in addition to a diversified line of other metal products and materials for construction purposes.

"Expansion of our activities beyond the purposes for which Southern States was formed in 1914 made it necessary to raise this new name on the horizon of Southern industry."

Fairbanks, Morse — N. O.

Page S. Proctor, for many years Manager of the New Orleans Branch of Fairbanks, Morse & Co., is retiring January 1. W. F. Wahlenmaier, for the past few years Manager of the company's Portland Branch, will take over the post vacated by Mr. Proctor.

Classified Advertisement



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Your used transformers are worth money! Send us a description and we'll tell you what they're worth! We build transformers and coils to your specifications. Send us your blueprints for prompt quotation.

TRANSFORMERS BOUGHT, SOLD, REPAIRED and RENTED
45 Years of Dependable Service

THE ELECTRIC SERVICE CO.
5323 Metzel St., Cincinnati 27, Ohio

FOR SALE

TWO Titusville Type A-4-26, 3 drum bent tube, water tube boilers, 6,109 sq. ft. heating surface, 200 psig design pressure, manufactured in 1952, complete with standard trim and supporting steel, not presently equipped with superheaters but designed for superheater installation. Recommended continuous operation load 200%. Manufacturers' Data Report and Certified Prints are available for inspection. Boilers are not now in use and may be inspected by appointment.

SOUTHERN PINE LUMBER COMPANY
Diboll, Texas

Rates quoted on special types of repeated advertisements.

McManus — Ch. of Board of The Southern Company

Clifford B. McManus of Atlanta has been elected Chairman of the Board of **The Southern Company**, succeeding Eugene A. Yates, who died in October. Mr. McManus has been Vice Chairman of the Board since January and before that he was President of The Southern Company and also President of the Georgia Power Company.

L. T. Smith, Jr., President of the **Gulf Power Company**, Pensacola, Florida, has been elected a Director of The Southern Company, to fill the existing vacancy on the board.

CLASSIFIED RATES

\$16 per column inch

\$24 per column inch displayed

Classified rates are net, payable in advance, each month. Rates are based on column inch, with three columns per page, 10 inches per column, column width 2 1/4 inches — a total of 30 column inches per page.

Special "Position Wanted" Advertisements submitted by individuals seeking employment, 10 cents per word per insertion, payment with order, minimum charge \$5.00. When used, Box Number address, c/o SOUTHERN POWER & INDUSTRY, 808 Peachtree Street, N.E., Atlanta 8, Georgia, count as eight words.

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By having your Safety-Relief-Gate-Globe-Check Valves rebuilt or serviced by us. Staffed with factory trained personnel we are able to give a new valve guarantee, cut down on time and freight charges. Work performed either in your plant or ours. Complete insurance carried. For particulars write:

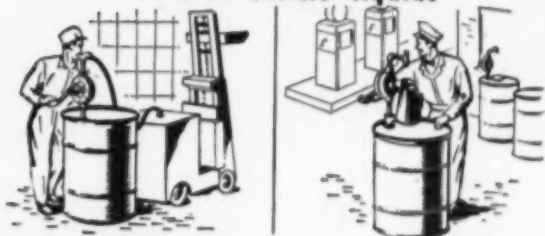
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578 NIXON STREET
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**AUTHORIZED REPAIR,
MAINTENANCE & SALES
AGENCY FOR SAFETY &
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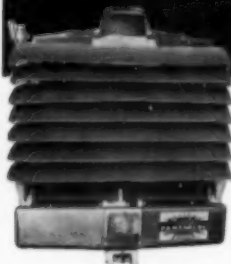


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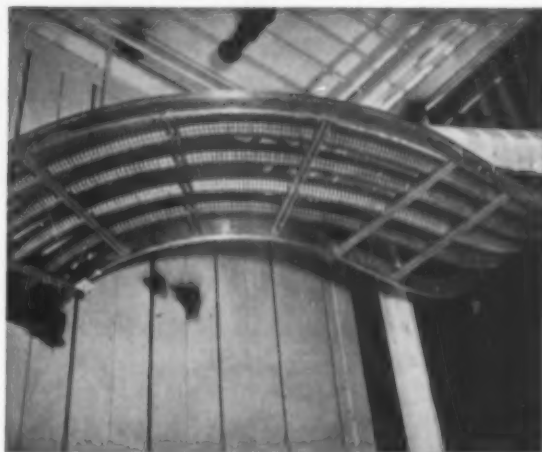
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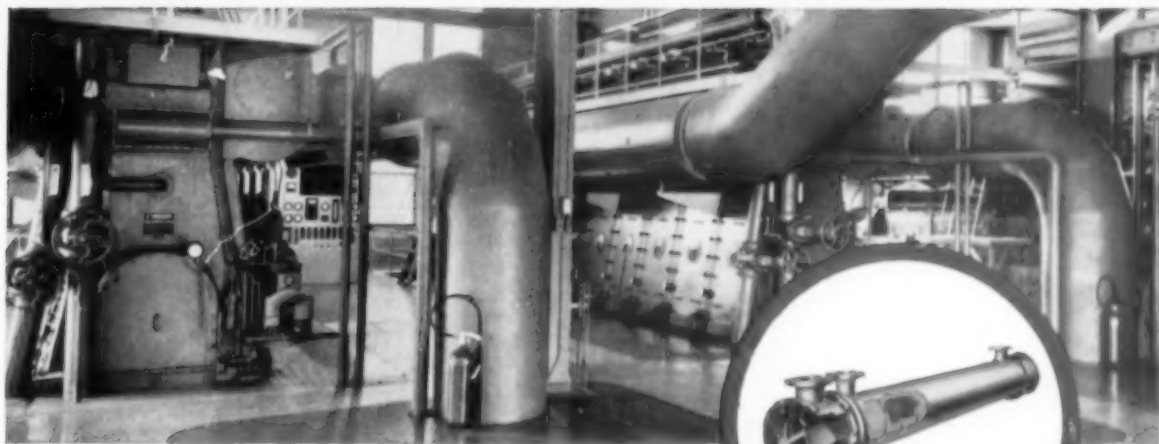
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On this tough, demanding job where dependable lubrication is a "must," Ross Exchangers have been selected to control lube oil temperatures. Power generation is kept at a peak and down time avoided, because moving parts receive their full share of properly cooled lube oil at all times.

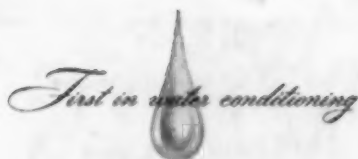
Where ruggedness and high thermal efficiency are top requirements, you'll find Ross Exchangers regularly at work, cooling oil, water, air and gas on all types of prime equipment. Of durable construction, they're completely pre-engineered, fully standardized, and available in a wide range of sizes.

Learn how Ross Exchangers can meet your heat transfer requirements by requesting Bulletin 2.1K5 and consult with a Ross sales engineer. Ross Heat Exchanger Division of American-Standard, Buffalo 5, N.Y. In Canada: American-Standard Products (Canada) Limited, Toronto 5, Ont.

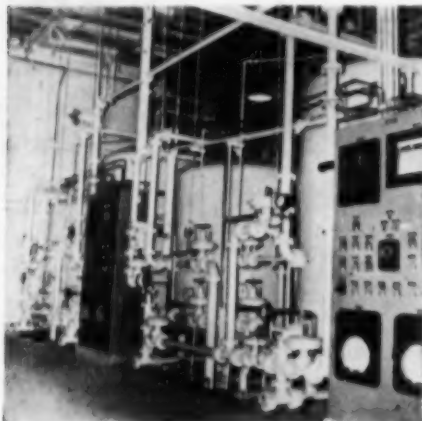
ROSS HEAT EXCHANGER

Division of **AMERICAN-STANDARD**



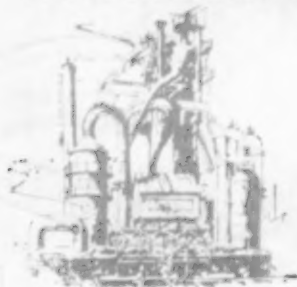


Installation below is a large paper mill. It provides an effluent with silica content below 0.02 ppm and total dissolved solids below 1.0 ppm. Total capacity 100,000 lbs/hr. for 1200 psi boiler.



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